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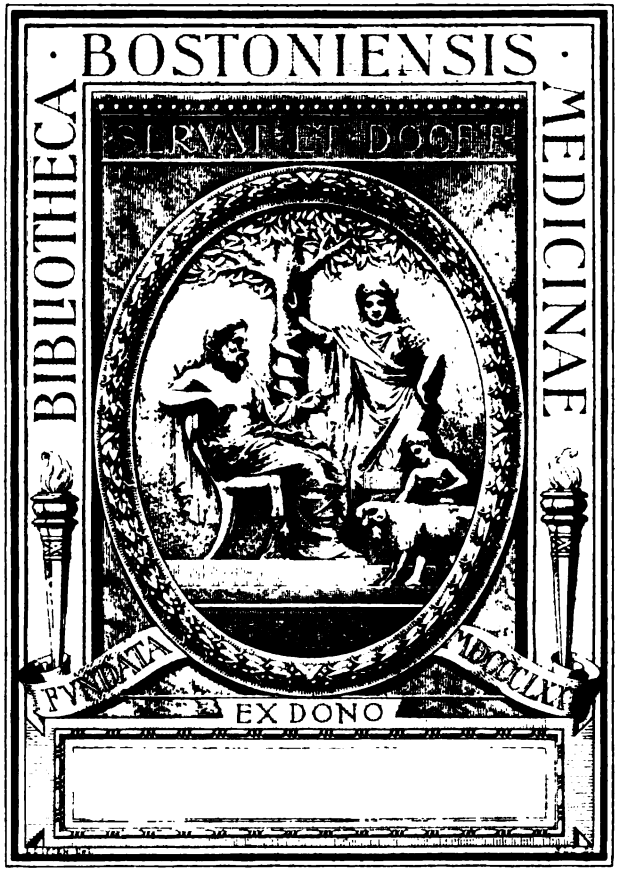
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THE SCOTTISH
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MEDICINE IN SOME EARLY UNIVERSITIES

An Address to the Fifeshire Medical Association

By DAWSON WILLIAMS, M.D., F.R.C.P.

IN seeking a subject upon which, in response to the flattering invitation of your President, I might address you to-day, it occurred to me that the subject of medical education was one of perennial interest to all members of the profession, and that it might not be unprofitable to look back to the position of medicine in the earliest universities, and the relation in which it stood to the origin of universities, and the growth of the university idea. For I am one of those who believe that in dealing with institutions of spontaneous growth which have their roots in the far distant past, we may learn from the history of their successes and of their failure, lessons which may save us from like failures, and lead on to similar successes to-day.

In the short time at my disposal I cannot do more than glance at a few points here and there, and I can say nothing which will be new to those who have given attention to the subject. I shall not deal at all with Scotland, which, in fact, did not possess a university within the period to be considered.

As to the nature of the causes which at about the same time, within the lifetime of one or two generations, brought into existence universities in Italy, France, Spain, and England, there is room for some difference of opinion. At one time it was the courtly custom of historians to attribute the foundation of all universities to the wisdom and the munificence of kings. This view has been shown to be erroneous. Like most other

human institutions which have endured, universities were not created; they grew up to meet a want felt by many men. They originated in that thirst for knowledge which is one of the elementary passions of the human race, though the state and the church soon stepped in to regulate their economy, their administration, and their privileges.

My object is to show that medicine and its professors, the men who desired to learn, and the men who were ready to teach medicine, took a large and honourable share in the great intellectual movement which brought universities into existence, and that it was in fact with medicine that the university idea first arose.

The darkness of the darkest ages has probably been exaggerated. The liberal arts and the special or technical studies of law and medicine were submerged by the flood of barbarian conquest, but they were not destroyed. The memory of polite literature, the use of Roman law as the basis for a just relation between man and man, and more especially between citizens of the same town, persisted in part of Italy, and the traditions of medicine survived both in that country and in France. Moreover, learning, though it suffered eclipse in the centre of the Roman Empire, survived and even flourished at certain parts of its periphery. When Charles the Great wanted a teacher to organise his Imperial School, he sent to the School of Arts at York for Alcuin, and the University of Paris, seeking to establish its claim to be the earliest of universities, has sometimes claimed the great Yorkshireman as its founder. But in fact it is doubtful whether he ever taught in Paris at all. He joined Charlemagne at Aachen in or about 782, and organised the Palace School. In 796 he withdrew to Tours; he was Abbot of St Martin at Tours, and revived and directed the School there, where grammar, logic, and elementary philosophy and history were taught.

In endeavouring to fix the period at which universities originated, we shall fall into error if we do not distinguish between the idea and the name.[1] The three great early univer-

[1] In common with everyone who nowadays attempts to write anything on the early universities, I must acknowledge my indebtedness to Rashdall's "Universities of Europe in the Middle Ages" (Oxford 1895), a writer as admirable in judgment as his work is comprehensive in scope.

sities were Salernum (medicine), Bologna (law), and Paris (theology); to these may be added, as hardly inferior in antiquity and early importance, Oxford, Montpellier, and Salamanca. But in the case of the three first named at least, the elements and essentials of a university existed, and students flocked to them before the term came into use.

Salernum has a well-founded claim, a claim no longer seriously disputed, to be the earliest of universities. The honour, therefore, of having been the first to bring the slowly germinating idea of a university to fruition belongs to medicine, for Salernum was at the time of its greatness a one-faculty university, a medical university. So early was it that it attained its greatest renown in the eleventh century, and the opening line of the *Regimen Sanitatis Salerni*—

. Anglorum regi scripsit tota Schola Salerni:

was addressed to Robert of Normandy, son of William the Conqueror, who had gone to Salernum to be cured of a wound, after the crusade of 1099. Salernum, therefore, preceded by more than a generation Bologna, where the law school first began to attain a great reputation about 1120. If we seek for a reason why the idea of a university first took shape in Salernum, and why it was realised in medicine, we may perhaps find an explanation in the fact that Salernum was a part of Magna Grecia; the Counts of Salernum acknowledged the Eastern Emperors, and the use of Greek undoubtedly persisted until a late period, for Adelard of Bath describes himself as listening, at some date antecedent to A.D. 1116, at a place near Salernum, to a "Greek philosopher" discoursing upon "medicine and the nature of things." The medicine of the Romans had drawn its inspiration from Greece, and Galen, though he practised in Rome, was a Greek and wrote in Greek. His works and those of Hippocrates were translated into Latin in the sixth century. The earliest works of the School of Salernum were founded on Caelius Aurelianus, the methodist, but the school did not begin to flourish until it began to rely upon Hippocrates and Galen as its guides. Arabic medicine also rested upon Greek authority; it appears to have been cultivated mainly by Jews, and as translations of Greek works with Arabic commentaries won their way in the universities of

Europe, Jewish physicians gained in popularity, insomuch that even popes preferred these heretics for their personal attendants.

Towards the end of the eleventh century flourished Constantinus Africanus, who, in the Benedictine monastery of Monte Casino (eighty miles away), under the patronage of the Abbot Desiderius, afterwards Pope Victor III., occupied himself in making abstracts and bad translations of Hippocrates with the Arabic (or rather Jewish) commentaries, and of Aristotle. As these Arabic commentaries grew in popularity, Salernum declined; its true inspiration was gone; the spread of the Arabic medicine was a retrograde movement, substituting authority for the interrogation of nature.

The term university appears to have been first applied to Paris by Innocent III. in 1209—

> Doctoribus et universis scholaribus Parisiensibus . . . universitatem vestram rogamus.

It was more formally applied in 1215 by the same Pope, when he made ordinances for the university and accorded to it the papal recognition, a sanction which, as we shall see, became in no long time of the greatest importance.

University does not mean a collection or union of colleges, a corporation embodying in one the subordinate collegiate corporations, as used to be assumed at Oxford and Cambridge. Nor is it a corporation professing universal learning, as certain historians who ought to have known better supposed. *Universitas* in civil law Latin meant what we should now call a corporation or company or guild. In German law writings the municipality of a town was called a *universitas*. According to Blackstone, the idea of a corporation was invented by Numa, and corporations "were afterwards much considered by the civil law, in which they were called *universitates*, as forming one whole out of many individuals; or *collegia*, from being gathered together."[1] Innocent III., when he applied the term to the teachers and students of Paris, intended to recognise that they were an organised body, and not a mere assembly of individuals. The term was felt to meet a need, and in the most ancient deed of the University of Paris (A.D. 1221) we find the expression: "We the university of the masters and scholars of Paris." A

[1] "Commentaries on the Laws of England," vol. i. chap. xviii.

mediæval speaker, when he used the term *universitas*, was thinking of an assemblage, corporation, or organised guild of persons, a university of scholars, or a university of masters and scholars. When he was thinking of the place, or of the schools, he would use the term *studium generale*, and that again meant not a place of general study, where study of any subject could be prosecuted, but a place or school to which a student from any country could resort.

A Master who had been admitted to the Guild of Masters in Salerno, Bologna, or Paris, was certain of being recognised and admitted to teach in other *studia* or universities. At first this was no more than a matter of custom, or courtesy. During the thirteenth century the two great powers of the time, the Holy Roman Empire and the Holy Roman Church, took hold of the idea, and the recognition of one or the other alone conferred the *jus ubique docendi*; even Paris and Bologna obtained bulls to confirm their already universally recognised privileges in this respect, though Oxford and Padua continued to claim the right without confirmation from pope or emperor.

Oxford has a certain claim to be called the oldest of extant universities, since the term was applied to it by John, who granted it a character in 1201, but the controversy is really about names. The organisation already existed in Paris and Bologna, as well as still earlier in Salernum.

We find at Montpellier also evidence that the organisation existed before the term university was applied to it. There was a medical school existed as early as 1137; like Salernum it drew its inspiration from the Greek physicians, but more from Galen than from Hippocrates. The first mention of the term university as applied to it, occurs in a confirmation of certain statutes granted by the pope's legate:—

> Universitas medicorum tam doctorum quam discipulorum.

It was in fact a description and not a technical term. The mention of the students in a solemn document of this kind as forming an essential part of the university is to be noted, but it is from an examination of the constitution of the University of Bologna that we shall get the clearest notion of what the early idea of a university really was.

At Bologna the universities, for there were several, were

guilds formed by the scholars who were not citizens of Bologna, for mutual protection. In a mediæval Italian city the law was not the same for a citizen and the stranger within its gates, and when foreigners, attracted by the fame of Irnerius and other great teachers of law, flocked to Bologna, they soon found it necessary to band themselves together to ensure what we should now consider elementary justice. In this way there were, towards the end of the twelfth century, four universities, Lombard, Tuscan, Roman, and Ultramontane. They were guilds of students; the teachers were not members. By the middle of the thirteenth century the universities were reduced to two, the Universitas Citramontanorum and the Universitas Ultramontanorum. Each was composed of nations; the Ultramontane University had as many as fourteen, one being that of the English, to which no doubt any Scot who found his way so far south would belong. Each university had a Rector, but by the fourteenth century they were combined for all practical purposes.

The weapons of the universities of students at Bologna to get their own way were migration and the boycott. Migration was used against the city; there were no university buildings, no invested funds; each individual student owned the clothes he wore, a few books, and such money as he happened to have in his pocket; it was easy for the whole body to march off to Vicenza, Padua, Siena, Pisa, or Florence. Their departure caused great grief to the lodging-house proprietors, the booksellers, the tavern-keepers, in fact to all the tradesmen of Bologna, and more than once the town had to eat humble pie. The boycott was used against any doctor (or professor) who made himself obnoxious. His lectures were put under a ban, and any student who ventured to continue to attend them was boycotted. In time the professors were brought into subjection to the student universities, but the power seems to have been used solely to prevent or correct abuses. A professor had to swear obedience to the students' Rector, and to get leave from his own students, the nations, and the Rectors if he wished to absent himself. If he did not attract five pupils to an ordinary, or three to an extraordinary lecture, he was fined by the city. He was required to begin his lecture each day punctually or he was

fined, and to end likewise or his students were fined for stopping on. He was bound to get through his subject in the academical year, and to ensure that he did so was compelled to deposit with a Bolognese banker a considerable sum which was forfeited if he failed to accomplish his task. The Rector appointed a committee of students to see that the rules were obeyed and report infractions to him.

Bologna as a medical university was second only to Salerno and Montpellier. The study of medicine was closely bound up with Aristotle, his physiology, and consequently the whole of his philosophy. His writings were studied as the scientific basis of medicine. The names of physicians occur in documents of Bologna early in the eleventh century, and they were styled Magister towards the end of that century. Some were ecclesiastics, but not all; indeed an ecclesiastic required a dispensation. Early in the thirteenth century a distinction was drawn between physicians and surgeons, the latter being called *Medici Vulnerum.*

In Bologna, it is interesting to note, medical students were members of the same university as the arts students. The law students and teachers were a separate organisation, although the students of all faculties obtained their degrees from the same Chancellor, the Archdeacon of Bologna. There was a distinct university of students in arts and medicine, and distinct colleges of doctors in these faculties. Sometime before the middle of the thirteenth century, teachers of medicine assumed the title of Doctor or Professor, and one of the first of them was Nicolaus de Farnham, who had taught arts previously at Oxford and Paris, and became Bishop of Durham in 1241.

Frederick II., who was King of Naples as well as Emperor of Germany, befriended Bologna, probably at the expense of Salerno. The medical school of Bologna became important towards the end of the thirteenth century, but the medicine of Hippocrates and Galen was strangely mixed up with astrology, and there was a regular faculty of astrology. Surgery, which came from Salernum to Bologna, made considerable progress there, especially in the fourteenth century, and Guy de Chauliac, the great surgeon of Montpellier in the next century, acknowledged his indebtedness to the teachers of Bologna.

The great glory of the medical school of Bologna is that it was the home of anatomy. Already in the time of Thaddeus of Florence, sometimes called the founder of the medical faculty of Bologna, who began to teach in 1260, dissection was practised, and Mundinus, the father of anatomy, was an early teacher of surgery there. Not only in Bologna, but also in other Italian universities, surgery was more honoured than in Paris or most northern universities. It was taught by doctors of medicine who claimed and exercised the right to practice surgery. In Paris it was looked down on as a base mechanic art. Apparently there was no doctorate in surgery only, though a man might get a licence in surgery.

The most ancient part of the university of Paris is the faculty of arts, which may itself have grown out of a school attached to the church of St Geneviève by order of Charlemagne, who enacted that schools should be established in all episcopal and collegiate churches. It is on this that the claim of the university of Paris to have been founded by Charlemagne about A.D. 800 is founded, and it is true that the chancellor of the church of St Geneviève was always chancellor of the faculty of arts, although the Archbishop of Paris was the chancellor of the other three faculties (theology, law, and medicine), and was considered the chancellor of the university as a whole. The subjects taught in this early faculty of arts were the seven liberal arts, consisting of the *Trivium* (grammar, logic, rhetoric) and the *Quadrivium* (arithmetic, geometry, astronomy, music).

A school of medicine in Paris existed in 1180, but the faculty of medicine was recognised as an independent organisation first in 1281, though there was a dean of the faculty probably as early as 1270, that is to say, it was established within about seventy years after the recognition of the university by Innocent III. The masters taught at first in houses belonging to the faculty of arts, or in private houses or rooms rented for the purpose, as did also the masters of the faculty of arts; and very queer places the masters sometimes got into.[1] A little after the middle of the fourteenth century (1369) the faculty of medicine bought a house near Notre

[1] De Vitry said of Paris in the thirteenth century, "in una autem et eadem domo scholae erant superius, prostibula inferius. In parte superiori magistri legebant, in inferiori meretrices officia turpitudinis exercebant."

Dame, and that was the beginning of the École de Médecine. These facts are worth remembering for they show that the university was a body of people, not a congeries of buildings.

In early days Paris never attained the reputation of Salerno or Montpellier as a school of medicine, and Thurot infers that its standard for graduation cannot have been high, from the circumstance that no one was rejected at the examination for the bachelorship during a period of more than a century (1395 to 1500). Towards the end of the thirteenth century the period of study for a licence appears to have been six years, unless the student already possessed a licence in arts, when it was five and a half years. In Paris, as in other northern universities, the surgeons were looked down upon by the doctors of medicine. They were clients, not members of the faculty, and in theory could practise only under the supervision of a doctor of medicine. It was not until 1436 that they were admitted as "scholars," but even then could not proceed to a degree, though they had a guild of their own in which they were admitted to the mastership. In 1491 the surgeons rebelled, but were brought to order by the faculty giving lectures in French to the barber-surgeons. The surgeons alleged that this was contrary to the statutes, and the faculty retorted by giving the lecture first in Latin to obey the letter of the statute, and then in French for the enlightenment of the hearers. The apothecaries also were supervised by the medical faculty, who forbade the sale even of a laxative medicine without a physician's prescription or ordinance.

In Paris, where many residential colleges existed, there was great rivalry between them: "the principals had every inducement to appoint only the most able teachers; and the emoluments of the rival professors (who were not astricted to celibacy) depended mainly on their fees. A blind munificence quenched this useful emulation. In the year 1719, fixed salaries and retiring pensions were assigned by the crown to the college regents (or professors), and the university gradually declined." These salaries were paid in the interests of the poorer students.

I have endeavoured to bring out two points. Firstly, that the early universities did not owe their origin to any act of king or pope, of prince or prelate, but to the circumstance that

the fame of certain teachers drew to the city in which they resided a great concourse of students from all parts of Europe, and that these assemblies of persons organised themselves, and claimed and enforced privileges and rights which were soon recognised by church and state. And, secondly, that in this great work of promoting and organising higher education the medical profession took the initiative, actually founding the universities of Salernum and Montpellier, and playing an important part even in those of Bologna and Paris, which owed their origin to lawyers and theologians.

I may perhaps be allowed to digress for a moment to observe that during the last century we have seen the medical profession playing a very similar part in England. New universities have, within a generation, been established in Manchester, Liverpool, Leeds, Sheffield, and Birmingham. In the four first named cities at least the origin of the university is to be found in the existence of a medical school. Men possessed by an enthusiasm for medicine and surgery undertook to teach, at their own cost provided the places in which to teach, and their reputation as practitioners and teachers drew together students of medicine. This is what happened at Manchester at the dawn of the nineteenth century, at Sheffield somewhat later, at Leeds and Liverpool later still. In all these cities the medical school was the first body which aspired to be an institution of university rank. In Birmingham also a school of medicine was founded nearly half a century before the wise munificence of Sir Josiah Mason called into existence the college which bore his name; the school of medicine subsequently became the medical faculty of that college, and finally to this combination was given the style and rights of a university.

May I now, in conclusion, attempt to trace in outline some picture of the career of a medical student in the thirteenth or fourteenth century? He was the son probably of a merchant or successful tradesman, possibly of a medical practitioner of some sort. He went as a boy to the cathedral school and learnt under the *magister scholarum* Latin grammar and Latin prose. Latin was the common language of the time, and without the power of reading, writing, and speaking it with some facility, he could not hope for success at any university.

When about fifteen or sixteen years old, or even younger, he set out on his journey, probably if he were an Englishman or Scotsman going first to Paris or Oxford with the intention of entering himself as a student of the *trivium*. If he chose Paris he would put up at an inn, and the masters, either in person or by the intermediary of students in their pay, would invite him to join their classes. He would make the acquaintance of compatriots already studying there, and, after undergoing a rough and foolish ceremony of initiation, he would be admitted a member of the nation of the country from whence he came. He might take private lodgings, he might join with a company (*socius*) of other students to hire and furnish a house, or he might arrange to live in the house or hall of his master. Once at work, he would find that he was expected to attend lectures from 6 to 10 A.M. He might take a collation consisting of a little bread and wine on rising, but his first meal, called dinner, was at 10 A.M. After dinner the master, if one were present, might begin a disputation, and perhaps the student would take some exercise, though there were no organised games. The afternoon lectures usually began at noon and went on until 5 P.M.; at 3 P.M. it was the rule in some places to have another collation consisting of a little wine and bread. After the last lecture he had supper, and was then free until curfew (7 to 9 P.M.), when he had another collation and went to bed. These were early hours, but it must be remembered that his lodgings or hall of residence were comfortless; there were no fires in lecture room, refectory, or study, and no glass to the windows, which were protected only by linen blinds. Candles were dear, so that in the evening the students were tempted to frequent taverns and often got into mischief.

The lectures given in the mornings were called ordinary, and could be given only by doctors or masters. Those delivered in the afternoon were called extraordinary, and might be given by senior students. In Bologna, a student admitted by the rector to read such lectures became known as a *Baccalaureus*, at first probably a slang term. In Paris it early became customary for a student entering upon this stage to read a thesis which was opposed by a student of somewhat junior standing; this procedure, at first voluntary, became

obligatory towards the end of the thirteenth century, and the applicant was termed the determiner, the ceremony being known as determination. Before proceeding to this ceremony the student had to produce evidence that he had attended lectures diligently.

At Bologna, Montpellier, Oxford, and probably at all universities, the books which a medical student had to read were laid down. The list varied in different universities, but nearly everywhere he had to take up the *Liber Tegni* of Galen and the *Aphorisms* of Hippocrates; other books commonly prescribed were other works of Galen and Hippocrates, the *Canon* of Avicenna and one of the medical treatises of Averroes. Candidates for the examination in surgery at Bologna took up part of Avicenna (the fourth canon), the surgery of Brunus, an early teacher at Padua, and attended lectures on the surgery of Galen and one book of Rhazes. The regulations of some of the universities prescribed that the candidate should actually possess certain of these books, and the ethics of the book trade were usually carefully regulated by university statutes. Every teaching doctor, or professor, had a repetitor, an assistant who repeated his lectures and questioned the student on them. There were also *repetitores speciales*, private tutors. At Montpellier, the list of text-books in use shows that the curriculum must have entailed a great deal of reading as well as diligent attendance at lectures. In Paris the requirements were rather less exacting, but in both places practical teaching and study, even in anatomy, was at a low ebb. Dissection does not appear to have been practised, and the French teachers, at any rate, were bookworms and theorists, dominated by the authority of the commentators on Hippocrates and Galen. At Bologna, as has been said, anatomy was studied by dissection from an early period; at Padua a candidate for the licence in surgery must have "seen" a doctor practising; and at some universities the aspirant for the degree of doctor of medicine must have practised for a year under the supervision of a "famous doctor."

We hear, nowadays, a great deal about the sufferings of the modern medical student, oppressed by the multitudinous subjects of a complicated curriculum. No doubt in England, and even in Scotland, his lot is less happy than that of his less remote

predecessors. In England, the country of the two Bacons, of Harvey, of Sydenham, of Cavendish, of Priestley, of Banks and Sloane, and of Hunter, the great universities, by some curious obliquity of vision, failed to perceive the importance of natural knowledge, and the training and testing of medical students passed largely into the hands of corporations, which possessed little tincture of that enthusiasm for learning, that passion for knowledge, which gave origin to the great universities of the eleventh, twelfth, and thirteenth centuries.

But if we go further back, if we compare what is required of the student of to-day with what was demanded from the student of Montpellier in the thirteenth or fourteenth century, it is very open to question whether the intellectual exertion expected from the earlier candidate for a medical degree fell at all short of that exacted from the modern student, while the latter has this advantage, that his teaching is far more objective and less theoretical, far more by practical work in the laboratories and the wards, far less a mere acquisition of the dicta of past masters of the art.

Degrees appear to have been established gradually and unofficially. At first any person who had attained to a certain proficiency was allowed, or claimed the right, to teach, for it must be recognised that the title of doctor at first had a signification strictly in accord with its etymology ; it meant a person entitled to teach. The term as used in the twelfth century signified teacher, and seems then to have been synonymous with magister. It was first applied as a description to Stephen Langton, whose nomination to the archiepiscopal see of Canterbury led to the struggle between John of England and Pope Innocent III. This was in 1207. There is evidence that in 1209 degrees were granted in Paris in civil law, canon law, medicine, and theology, and it is pretty certain that the degree of doctor in the four faculties was recognised by Innocent III. in 1213. At Bologna the whole system of degrees was fully established before 1219. The ceremony of inception or the taking of a degree always, in the early days of the universities, involved two ideas. Firstly, the actual performance of teaching by the candidate, and secondly, his recognition by his master and other members of the college of doctors or masters as a member of their body. At Bologna the public

inception was preceded by a private examination, which after a time became the real test, the public examination being a mere ornamental ceremony attended by much display and a great deal of hard drinking. The candidate at the private examination was required to lecture on two passages, and was allowed several hours to consider the subjects, apparently in consultation with his master; after lecturing on the two passages he was examined on them by two doctors appointed by the college of doctors, and other doctors present might ask him questions, but the students in their statutes required an examiner in this "rigorous and tremendous examination" to treat the candidate "as his own son." The doctors present then voted by ballot as to the sufficiency of the candidate's knowledge, and the archdeacon who presided declared the result. One of the oaths taken on inception by a master in medicine at Paris was to complete a period of "necessary regency," that is, to lecture for two years, unless dispensed by the university. This dispensation was not, it would seem, in early days given for more than one of the two years.

Finally, we may ask, to what privileges did the successful candidate whose pockets had been emptied by the cost of providing a feast, or perhaps, if he were a Spaniard, a free bull-fight, for the whole university become entitled? His privileges varied in different countries, and even in different cities. Probably they everywhere looked better on paper than they proved to be in practice. Frederick II., the grandson of Barbarossa, who was born in 1194, not only showed great interest in the establishment and the extension of universities, but made ordinances as to the medical curriculum and as to the right to practice medicine and surgery in Southern Italy. Holding that the science of medicine cannot be understood without a previous training of the reasoning powers, he directed that no one should study medicine unless he had studied logic for three years. This meant, doubtless, the *trivium*—grammar, logic, and rhetoric. The study of surgery might, however, be begun before the end of the three years. The physician had to study medicine for five years; the surgeon had to study surgery for one year, and to learn in the schools the anatomy of the human body. The candidate in medicine at the end of his five years was examined publicly by the

masters, and, if satisfactory, received letters testimonial that he had studied the prescribed time, that his knowledge was sufficient, and that his character was good. Armed with these testimonials, the equivalent to a degree, he had to present himself before the king or his viceroy to receive a licence to practise; but for the first year, he might practise only with the counsel of an experienced brother, a kind of apprenticeship after qualification. Unqualified practice was punished by confiscation and one year's imprisonment.

Frederick II.'s ordinances also laid it down that a physician must visit his patients twice a day, and once at night if required; regulated his fees for a visit and a journey, and forbade him to contract to cure for a fixed sum, or to form a partnership with the *confectionarii* (compounders). The confectionarii were required to take an oath to make their confections, a general term, according to the form prescribed, and to see that they kept this oath were subjected to the control and inspection of the masters in physic, or of special officers appointed *ad hoc* in every district.

In 1271 the faculty of medicine of Paris, then still an integral part of the faculty of arts, issued an ordinance forbidding the exercise of medicine to Jews and Jewesses; permitting it to students of the art only in the presence of a master and according to his advice; ordering surgeons, apothecaries, and herbalists to keep strictly within the limits of their functions, and to be satisfied—the surgeons with manual operations, the apothecary with compounding medicaments, and the herbalist with the administration of simples in accordance with the prescription of the physician.

In 1352, John, the king of France who four years later was defeated and taken prisoner by the Black Prince at Poitiers, issued ordinances regulating the practice of medicine in Paris. He forbade *l'exercice de la médecine à ceux qui n'avaient point fait leurs Preuves*, ordered that none should be admitted to practice until after he had been examined and found sufficient by the masters and doctors regent of the faculty, and enjoined the provost of Paris to see that the law was obeyed.

ACUTE LYMPHATIC LEUKÆMIA

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CASES of acute lymphatic leukæmia are by no means uncommon, but, in a condition whose ætiology and histogenesis are still obscure, it is essential that all examples should be noted which help in the elucidation of the difficulties which surround its cause and origin. During the past eighteen months four typical cases have been under observation in Leith Hospital, and I propose to give a brief account of them and discuss any bearing they may have on the general problem. Three of the cases were under the charge of Dr Elder, Senior Physician in the Hospital, to whom I am indebted for the opportunity of studying them while in the wards. The other case was under my own charge in Leith Hospital.

I will first of all describe briefly the history of the four cases, with an account of the post-mortem findings.

CASE I.—J. O., male, aged 32 years.

He was admitted to Leith Hospital in July 1904. He had suffered for six weeks before admission with pains in the back and stomach, but had been off work and confined to bed for only a week. On admission he complained of severe pains in the small of the back and bleeding gums. The gums had been swollen and bleeding at intervals for ten days.

He had previously been a strong healthy man, never losing a day's work, and his only trouble had been habitual constipation for two years.

He was obviously acutely ill when admitted to the Hospital. His temperature was 102.6° F., his pulse 128 per minute, and he was sweating very profusely. The pain in his loins was very severe.

Petechial hæmorrhages—small—were present on both legs, on the anterior aspect of the trunk, and on the palms of the hands.

The gums were very much swollen, overhanging and almost

concealing the teeth at parts—tender, soft, and bleeding, and showed here and there small foci of suppuration.

Hæmopoietic System.—The spleen was only very slightly enlarged, and on the day following admission one could feel its lower edge on deep inspiration just at the left costal margin.

The glands on each side of the neck were slightly enlarged, not visibly, but on palpation could be felt along the sterno-mastoid muscles, each rather less than the size of a pea. A few could be felt in each axilla. The glands were hard, discreet, and not painful on pressure.

The blood count showed—

2,900,000 red blood corpuscles.
60% hæmoglobin.
200,000 white blood corpuscles.

(The differential analysis of the white blood cells will be discussed later.)

The urine showed a trace of albumen.

Progress.—The patient lived only four days after admission to Hospital. The profuse sweating continued; he slept very little, and the temperature remained high, though swinging at times. No hæmorrhages preceded death.

Post-mortem Report—Thorax.—No thymus visible. Mediastinal glands not enlarged. Thyroid healthy. Tonsils enlarged and firm. Axillary glands slightly enlarged, chiefly on left side, and are about size of a pea.

Abdomen.—Mesenteric glands enlarged, one measuring 2 cm., all the others being very small.

Spleen.—Slightly enlarged. Is not very firm. Deep red colour on section.

Bone Marrow.—In the long bones greyish-pink in colour and soft and gelatinous in consistence.

CASE II.—G. C., male, aged 16.

He was admitted to the surgical wards of Leith Hospital on December 1st 1905, complaining of a swelling on inner side of right thigh, situated over the saphenous vein. It was painful, hard, and tender. There were no enlarged glands in the groin. On December 15th a rash appeared over the anterior aspect of the chest and abdomen, and he was removed to Pilton Hospital for observation. In two days he was

sent back, and was admitted to the medical wards of Leith Hospital.

Patient on admission looked thin and anæmic. His temperature was 100° F., and his pulse 120 per minute.

Alimentary System.—Tongue was foul and breath bad-smelling. The gums were swollen, but not to any great extent, and above the canine and first molar teeth on the left side was a small ulcer.

Hæmopoietic System.—Along the inner side of the sterno-mastoid muscle, on each side of the neck, a string of enlarged glands, all about the size of a pea, could be felt—discreet, hard, and not painful. There were also a few of the same size in each axilla and in each groin, and along the saphenous veins of the thighs.

Spleen.—Could not be felt, but on percussion extended forwards a little.

Blood.—Red blood corpuscles, 1,700,000.
Hæmoglobin, 40%.
White blood corpuscles, 156,000.

Other systems showed nothing to note, and there were no hæmorrhages in the skin or mucous membranes.

Progress.—On admission to the medical wards, and for some days afterwards, the boy had no complaints, and insisted that he was quite well. About a week after he became much paler and complained of being sick, and his ankles began to swell. The swelling gradually extended up the legs. The ulcer in his mouth, which was quite small to start with, in spite of treatment spread rapidly, and in a few days had involved the whole of the roof of the mouth and inner aspect of the cheek on the same side. It spread round the angle of the mouth and involved the greater portion of the skin of the cheek. He died after being in hospital 18 days, but was only acutely ill for slightly over a week.

Post-mortem Report—Thorax.—Thymus gland enlarged, reaching down to the third rib. The mediastinal glands are enlarged but only very slightly.

Abdomen.—Spleen very slightly enlarged. Dark purple in colour. Softer in consistence than normal.

Liver.—Shows a few hæmorrhages over the left lobe.

Mesenteric glands enlarged to size of small peas.

Intestines healthy. No enlargement of Peyer's patches and solitary glands. No hæmorrhages in the mucous membranes.

Bone Marrow.—In the long bones is paler than usual and softer in consistence.

CASE III.—J. W., male, aged 30.

He was admitted to Leith Hospital on the 6th of March 1906. He complained of bleeding from the nose and gums, and abscesses in the buttocks.

He became ill eight weeks before admission, with tiredness and inability to eat his food, and thought his stomach was out of order.

After rest in bed for a day or two he improved somewhat. Four weeks before admission he began to have swelling and pain in the right ischio-rectal region. This was poulticed and burst, discharged offensive pus, and slowly began to close. Two weeks later an abscess formed on the other side, which was opened in a few days. About the time the first abscess began to form his gums became swollen and sore, and blood oozed from them, and a week before admission he had a violent bleeding from the right nostril. During the next two days he had five slight attacks of epistaxis, and the day before admission a violent bleeding for five hours, which was only stopped after admission by plugging.

For some days before admission he complained of pains in the bones of the legs and thigh, and loss of vision in his right eye. On admission, the temperature was 102° F., and the pulse 104 per minute.

Alimentary System.—Gums very swollen, overhanging the teeth in the upper jaw and almost concealing them. The gums were pale, very hard, and at parts nodular. They bled freely. The breath was very foul, the appetite gone, and he felt sick. He had been habitually constipated for some years.

Hæmopoietic System. — *Spleen* was slightly enlarged, its edge being felt at the left costal margin on deep inspiration.

The *glands* of the body generally could be felt to be enlarged, but to a very slight degree. They were hard and not tender.

Blood.	*8th March.*	*15th March.*
R. B. C.	2,000,000	1,000,000
Hæmoglobin	45%	40%
W. B. C.	145,000	187,000

The urine contained a slight trace of albumen. Circulatory and respiratory systems healthy.

Nervous System.—Intense frontal headache since beginning of illness, and also giddiness.

The optic discs were normal. No changes observed in the retinal vessels. Extensive hæmorrhages were present in both eyes towards the central portion of the retina, and round the disc, especially the right. The hæmorrhages were superficial and deep, recent and old.

Progress.—Patient was greatly troubled with pain in both ischio-rectal regions, each of which was swollen, red on the surface, and hard. To relieve the pain incisions were made in each, but no pus was got, only a little thin serous discharge. The incisions showed no sign of healing, the watery discharge continued, becoming green in colour, as did also the tissues in the region of the incision.

After admission patient remained fairly well for a day or two, but then complained of sickness and became very drowsy. The pain in the buttocks troubled him very much, and morphia was given. Great difficulty was experienced in stopping the bleeding after the hypodermic. On 15th March purpuric spots appeared on the left side of the thorax, which gradually spread all down the left side of the body and outer aspect of thigh on same side. He died on 16th March.

No post-mortem examination could be obtained.

CASE IV.—R. B., male, aged 12.

He was admitted to Leith Hospital on 23rd January 1905, complaining of pain in the left side and bleeding gums.

Up to six weeks before admission he had been quite well, and at school. His mother then noticed that he was very tired looking and inclined to sleep a great deal. Three weeks later pain set in in the left side, and he complained of his gums being swollen and tender, and occasionally bleeding. His mother also noticed at this time lumps appearing on each side of the

neck, tender for a day or two, but afterwards not so. He got gradually paler, was troubled with sickness, appeared feverish at nights, and sweated profusely. For a week before admission he had daily epistaxis. Up to the beginning of this present illness he had been a strong and healthy boy.

On admission he was very pale and thin. Sub-conjunctional hæmorrhages were present in the right eye, petechiæ over the front of the chest and abdomen, recent and old.

The temperature was 101° F., and the pulse 128 per minute.

Alimentary System.—The tongue was very foul. The gums were slightly swollen, soft and spongy, were ulcerated where the teeth joined them, and bled readily. He vomited a great deal.

Hæmopoietic System.—On both sides of the neck the glands were enlarged, varying very much in size from a pea to one as large as a walnut. They were discreet and not tender. The glands of both axillæ and both groins were enlarged to the size of marbles.

Spleen.—Was enlarged, its lower border reaching nearly to the umbilicus. It was hard and tender on palpation.

Blood.	*23rd Jan.*	*28th Jan.*	*1st Feb.*
R. B. C.	2,400,000	1,300,000	800,000
Hæmoglobin	39%	25%	20%
W. B. C.	62,500	60,000	56,000

The other systems showed nothing to note.

Progress.—Patient each day became gradually paler, was very irritable and delirious at night. The spleen remained about the same size as on admission, and there were no fresh hæmorrhages.

Post-Mortem Report.—*Thorax.*—Thymus much enlarged. Mediastinal glands enlarged. Numerous small hæmorrhages on the visceral pericardium.

Abdomen.—Parietal peritoneum covered with small recent hæmorrhages. Liver slightly enlarged. Stomach mucosa showed numerous small hæmorrhages. The mesenteric glands were enlarged. The small intestines showed numerous hæmorrhages the size of a pin's head in the mucous membrane, especially towards the lower end of the ileum. Peyer's patches

were unduly prominent, the central portion of each being greenish grey in colour.

The *Spleen* was hard, and its capsule was thickened. No hæmorrhages.

There were numerous hæmorrhages in the capsule of each kidney.

Bone Marrow, in all the long bones, was reddish in colour and of putty consistency.

Brain and meninges healthy.

Symptomatology of Acute Lymphatic Leukæmia.

Acute lymphatic leukæmia has, in almost every case, entered on its final stages when it comes under the physician's notice, and usually in a few days, or at most a week or two, the fatal termination ensues. In none of these four cases, after careful inquiry, could any circumstances be elicited which in their antecedence had any bearing on the onset of the condition. An account of previous slight ill-health, lasting for some weeks, with vague symptoms of loss of appetite, debility, and weakness, was all that preceded the onset of the acute symptoms. During the early stages, therefore, very few observations have been made on the condition of the blood in acute lymphatic leukæmia, and, so far, it is impossible to be certain that even at this time the changes in the blood peculiar to the condition have become established, though it is reasonable to suppose that even then the vague, general symptoms are the result of the altered blood elements.

All four cases, it will be noticed, occurred in males, and in young males, the youngest being 12 and the oldest 32 years of age. The great proportion of cases of acute lymphatic leukæmia occur before 40, and two-thirds of all the recorded cases are in males.

As has been pointed out, the period from the onset of the prodromata to the fatal termination is in all cases a short one. These four cases lived only for periods of 6, 8, 10, and 6 weeks after the onset of the initial symptoms. For periods of 5, 7, 8, and 5 weeks they were able to be about, complaining only slightly of pains in the back, weakness, and

dyspepsia, but in all it was only a matter of days, once the typical symptoms had set in.

The more important signs which characterise acute lymphatic leukæmia are fairly constant, though they vary in degree in the different cases.

1. *Fever.*—From the onset of the acute symptoms this is always present, and is of an irregular type. The four cases all had fever, ranging irregularly between 99° F. to 102° F. There was in all the cases a fall to normal and below for more than 24 hours before the fatal termination.

2. *Enlargement of the Lymphatic Glands.*—Recently attention has been drawn to the fact that the enlargement of the lymphatic glands is not the typical and constant sign which was looked on as the unfailing rule in acute lymphatic leukæmia. Cases are on record where no changes in the glands, either macroscopic or microscopic, were found. In three of the four cases under observation, enlargement of the glands could be made out only after careful examination. They were not visibly enlarged, and in none of the three did any gland attain a size larger than a pea. I would suggest that in acute lymphatic leukæmia, enlargement of the lymphatic glands is to be looked upon as a secondary condition appearing after the actual onset of the disease, and that only very slight enlargement be regarded as what most frequently occurs in these cases. The question of the enlarged lymphatic glands has an important bearing on the ætiology of the condition, and will be referred to later.

When enlarged, the glands are always discreet, hard, and not painful.

3. *Enlargement of the Spleen.*—Here again enlargement of the spleen as a sign in acute lymphatic leukæmia must have assigned to it only very secondary importance. In cases 1, 2, and 3 of the series, the spleen was only very slightly enlarged; in case 1 it could not be felt at all, and in 2 and 3 only its edge could be made out at the costal margin on deep respiration. In case 4, where the glands were visibly enlarged, so too was the spleen—reaching, as it did, nearly to the umbilicus.

4. *Hæmorrhages.*—Hæmorrhages form the most definite and constant sign in acute lymphatic leukæmia. They occur at all sites in the body, and may be slight or severe. Three

cases out of the four had hæmorrhages: case 1 in the skin of the hands, legs, and trunk, and from the gums and post-mortem in one kidney; case 3 had severe epistaxis, bleeding from the gums, and hæmorrhages into the retina of both eyes, and just before death hæmorrhages into the skin. Case 2 had no hæmorrhages during life, nor were any found post-mortem. Case 4 had bleeding from the gums, both conjunctivæ, numerous hæmorrhages in the skin of the abdomen and thighs, and post-mortem in the parietal peritoneum, pericardium, mucosa of stomach, and small intestine, and mucosa of the bladder. In all acute cases of illness where hæmorrhages occur, particularly from the gums, and at the same time from some other sources in the body, acute lymphatic leukæmia should always be suspected.

5. *Necrosis and Ulceration of the Mucous Membranes.*—These necessarily accompany and often follow hæmorrhages, and are very characteristic of acute lymphatic leukæmia, and should suggest the correct diagnosis. In all four cases the mucous membrane of the buccal cavity showed this sign. Usually the condition, as in these four cases, shows first in the gums, which appear swollen, and are hard and unfiltrated. The swelling is nodular, the nodules consisting of infiltration of lymphocytes. Because of the exposure of the mouth to injury and infection, these nodular infiltrations readily break down, and bleeding with ulceration and necrosis set in. The necrosis may be severe, as in case 2. Here no hæmorrhages occurred, but a small ulcer appeared in the mouth, which, in spite of treatment, spread and involved the whole roof of the mouth, the mucous membrane of the cheek, and extending round the angle of the mouth, formed a large ulcer on the left cheek.

Condition of the Blood.—The important sign in acute lymphatic leukæmia, which gives it its name and assures one of a positive diagnosis, is the absolute increase of large mononuclear cells in the blood. The actual numerical increase varies within wide limits, but never reaches the extreme figures obtained in the myelogenous form of leukæmia.

In these four cases the numbers were 200,000, 145,000, 156,000, and 62,500 per c.m.

The following table gives an analysis of the different forms

of white cells in the blood, and also the number of red cells and the hæmoglobin.

	R. B. C.	W. B. C.	W.:R.	Hb.	Lymphocytes.		Polynuclear Leucocytes.	Myelocytes.	Eosinophiles.
					Large.	Small.			
	Per cm.				%	%	%	%	
Case I.	2,900,000	200,000	1:15	60	93.5	4	2	.5	1 or 2 in a field
Case II.	1,700,000	156,000	1:10	40	98	.8	1	.2	a few
Case III.	2,000,000	145,000	1:14	40	96.4	.5	2.4	.7	a few examples
Case IV.	2,400,000	62,500	1:38	39	46.6	50.9	2.2	a few	considerable number of normoblasts.

Before death the red cells had become reduced to 1,000,000 in case 3, and to 800,000 in case 4.

In acute lympathic leukæmia there is always a considerable degree of associated anæmia, which gradually increases as the case proceeds to a fatal termination, and it has been suggested that the changes in the red cells play as important a part in the disease as do the leucocytes. The blood count of the red cells and the percentage of hæmoglobin resemble somewhat what is found in pernicious anæmia, more particularly in the final stage of the condition. This was particularly so in case 4, where the blood count—800,000 red cells and 20 per cent. of hæmoglobin — together with the megalocytes and nucleated red cells, presented a picture entirely analogous to that found in pernicious anæmia.

The actual increase in the number of white cells varies, but does not in any case usually exceed 200,000 per c.m. In stained fields it is at once seen that the increase is one affecting the non-granular cells. Granular cells of all kinds are remarkable by their absence.

In cases 1, 2, and 3 the increase will be seen from the table to have been one entirely of the so-called large lymphocytes—the percentages being 93.5, 96.4, and 98 of the total number of white cells. (One thousand cells were counted in each case in arriving at the differential counts.)

The small lymphocytes formed 4, .5, and .8 per cent. of the white cells in these three cases.

Case 4, which differed clinically in various points from the other three cases, had 46.6 per cent. of large lymphocytes, and 50.9 per cent. of small lymphocytes.

Careful differential counts of the white cells in all cases of acute lymphatic leukæmia will in all probability show that the increase is entirely one of the so-called large lymphocytes.

The polynuclear leucocytes in all the four cases were present to a very slight extent, the percentages being 2, 2.4, 1, and 2.2. There was not only a percentage decrease of these cells, but an absolute diminution of the actual numbers in the blood. Of eosinophilic leucocytes only a few examples were found in each case.

Myelocytes formed an appreciable percentage of the white cells in three of the cases, viz. .5, .7, and .2. All were of the eosinophilic variety. In case 3 a remarkable ante-mortem increase of eosinophilic myelocytes took place, the number rising to 4 per cent. of the total white cells.

[An additional interest is found in case 3 in the associated condition of suppuration in the form of the ischio-rectal abscesses. Suppuration occurring in the course of an acute lymphatic leukæmia usually alters the blood picture by artificially increasing the total number of polynuclear leucocytes in the peripheral blood. In this case, at any rate after the abscesses had been evacuated but were still discharging, there was no apparent leucocytosis present, the percentage of polynuclears being only one. In addition, although a great deal of swelling again set in after admission, on opening no pus was obtained, pointing undoubtedly to a failure in the bone marrow to supply polynuclear leucocytes, and to an involvement of it to a great extent in the long bones. Films of the pus showed broken-down polynuclear leucocytes, but also large numbers of the same large mononuclear cells as found in the blood were present. If these cells be lymphocytes it is difficult to account for the great number found in the pus from the abscesses. They certainly did not result from the admixture of blood with the discharge, as only a very few red cells were present in the films. Cultures of the pus showed the bacillus coli communis to be the chief organism.]

Microscopic Post-mortem Changes.—The changes found, post-mortem, in acute lymphatic leukæmia occur chiefly in the bone marrow and secondarily in the spleen and lymphatic tissue of the body generally.

Bone Marrow.—In three of the four cases a post-mortem was obtained, and in them the marrow of the long bones was found to have lost its fatty appearance and character, to have become reddish grey in colour and of gelatinous consistency.

Microscopically.—In all three cases, but more especially in cases 1 and 2, the normal elements of the marrow were almost entirely lost. In cases 1 and 2 relatively few red cells were seen in the films, and no nucleated red cells either normoblasts or megaloblasts were present. Only here and there too could a granular leucocyte be seen. When found, they were of the myelocytic type, and the majority eosinophilic ; the predominating cell was, as in the blood, the large mononuclear cell with large faintly staining nucleus and a narrow rim of basophilic protoplasm. In cases 1 and 2 a differential count of the leucocytes in the bone marrow showed over 96 per cent. of these large mononuclear cells. In case 4 the marrow had a larger proportion of granular cells—polymorphs and myelocytes —than in 1 and 2, but again the lymphocytes dominated the films. As in the blood the small lymphocytes in this case were slightly in excess of the large mononuclear cell or large lymphocyte.

Lymph Glands.—As stated, in cases 1, 2, and 3, only very slight general enlargement of the lymphatic glands was present. In case 4 the glands were enlarged to a much greater extent, and also the intestinal lymph nodules were unduly prominent and enlarged.

Microscopically.—In cases 1 and 2 very little change could be made out in the lymphatic glands. As in normal glands they showed scattered foci of cell proliferation, which, however, were mainly composed of small lymphocytes ; and the large lymphocytes, which formed over 90 per cent. of the leucocytes of the blood, were not present to any great extent. No changes were present in the intestinal lymph nodules. In case 4 the glands looked much more cellular, and instead of scattered foci of small lymphocytes the whole gland consisted of a mass of proliferating lymphocytes.

Spleen.—In cases 1 and 2 the spleen was only very slightly enlarged. Microscopically the spleen retained its normal structure. In case 4, where the spleen was considerably enlarged, the whole organ appeared crowded with lymphocytes, large and small—the small being much in excess. The parenchyma of the spleen could not be definitely made out, as in the normal.

Histogenesis of acute Lymphatic Leukæmia: its probable myelogenic origin.—By Ehrlich and his pupils acute lymphatic leukæmia has been looked upon as primarily a condition of the lymphatic glands, which becoming irritated, presumably by some unknown poison, enlarge, and become the seats of active lymphocyte proliferation. These are passively washed into the blood, account for the picture it presents on examination, and ultimately invading the bone marrow, replace its normal structure and elements. The origin of acute lymphatic leukæmia is therefore lymphatic and not myelogenic. They account for those cases where, in spite of an extraordinary production of lymphocytes, the lymphatic glands appear either not enlarged at all or only slightly, and present few microscopical changes, by assuming that these lymphocytes, as fast as they are produced, are driven into the blood and also invade other organs. The facts, however, are found by others, and as represented in these four cases do not agree, in my opinion, with these findings. In three of these cases, as I have pointed out, very slight enlargement of the lymphatic glands was present, and microscopically the changes in the glands and lymph tissue generally was not of so great extent or of the same nature as to account for the condition. The prevalent type of cell in the lymph glands and lymph nodules elsewhere was the small lymphocyte, which, in the blood, and also in the bone marrow, was present in no greater excess almost than in normal blood. For the source of the large mononuclear cell which permeated the blood and bone marrow we must look elsewhere than the lymph glands. The bone marrow itself is histologically a structure which is undoubtedly capable of producing these so-called lymphocytes, and it is reasonable to suppose that the bone marrow may be the source of the large mononuclear leucocytes in acute lymphatic leukæmia. In this condition lymphocytic degeneration probably occurs primarily in the bone marrow, resulting in

an appearance of a germinating lymph centre in the bone marrow, and accounting therefore for the appearances in the blood, composed as it is almost entirely of these large mononuclear cells to the almost complete exclusion of other leucocytes. The changes in the lymph glands and lymph nodes are probably only secondary, and, the leukæmia once started, they may enlarge and proliferate and participate to a slight extent in the production of the abnormal numbers of lymphocytes. It is probable that, in those cases where no changes at all are found in the lymph glands and tissues, the degeneration in the bone marrow was of so acute a nature as to result in death before other lymphatic structures became involved. In certain cases of pernicious anæmia, too, which showed megaloblastic degeneration of the marrow, one has found large numbers of these mononuclear cells in the marrow.

The peculiar tendency of the anæmia, in cases of acute lymphatic leukæmia, ultimately to resemble very closely a pernicious anæmia, both in the red cell count, colour index, and type of red cell in the blood, is to be taken into consideration in ascribing to acute lymphatic leukæmia its origin in the bone marrow.

The histological findings on the whole, to my mind, point to the condition being therefore entirely myelogenic, and not lymphatic in origin.

In acute lymphatic leukæmia another point arises of equal interest and importance. What are the large mononuclear cells which predominate in the blood and bone marrow in this condition? Are these cells lymphocytes exactly analogous to the large lymphocytes found normally in small proportions in the blood? In chronic lymphatic leukæmia, the small lymphocytes which form the very large percentage of the leucocytes in this condition, resemble in every way those in the blood and in the lymph glands, and undoubtedly have their origin in these glands. In acute lymphatic leukæmia many of the large mononuclear cells present characteristics which are so atypical that it is doubtful if they can be classed as true lymphocytes having their origin in the lymph glands and tissues.

Some writers—and among them Ehrlich—maintain that large lymphocytes have absolutely distinct and definite char-

acteristics, while others find a difficulty in separating them from the large mononuclear leucocytes present in very small numbers in normal blood, a cell originating in the marrow. According to Ehrlich, a true large lymphocyte in a film, stained, say, with methylene blue, always shows a very strong basic protoplasm and nucleus, the nucleus staining more feebly than the protoplasm. On the other hand, the large mononuclear leucocyte has a more feebly basic protoplasm and nucleus with the stain predominating in the nucleus. It would be inadvisable to draw a clear distinction between cells on the single ground of staining affinity. But in acute lymphatic leukæmia the predominating cells present undoubtedly characteristics varying from the ordinary large lymphocytes found in normal blood. Most of the cells are very large, considerably larger than the ordinary polynuclear leucocyte, and the nucleus and protoplasm show numerous variations from normal. The nuclei in all four cases, but more especially in case 3, showed a great tendency to multiplicity. Beginning at the margin as a small indentation, all degrees of division up to the presence of two nuclei were found in these large mononuclear cells. In some, more than two nuclei were seen. In those in which division had begun and progressed to some extent the protoplasm stained only faintly basic, and in the eosin and methylene blue preparations was of a purplish tint with the eosin predominating. The nucleus in these cells stained deeper than usual. In some of them a few granulations were observed seemingly neutrophilic.

More numerous observations will require to be made on the cells occurring in this condition before they can be definitely classified, but I would suggest that the large mononuclear cells characteristic of acute lymphatic leukæmia are produced in the bone marrow, and are not of the nature of large lymphocytes but an abnormal cell, probably a retrogressive type of some of the ordinary leucocytes of the bone marrow.

THE ANTIDOTE AND EMERGENCY CASE: A NECESSITY

By W. G. AITCHISON ROBERTSON, M.D., D.Sc., F.R.C.P., F.R.S.E.,
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AMONGST the impedimenta of every medical practitioner the midwifery bag maintains a paramount place. One would think little of a man who kept this requisite in bad order, or who, when the call came, had to run hither and thither collecting forceps, chloroform, needles, sutures, soap, etc. Every practical man keeps all these articles clean and in a bag or metal case ready for immediate use.

Yet, in truth, there is usually but little need for one to hurry to undertake the duties of the accoucheur. It is to be feared that in too many cases early arrival on the scene ends only in weariness to the practitioner.

On the other hand, cases of accident, suicide, or poisoning allow of no delay in their treatment. A few minutes or even seconds may make all the difference between recovery and death of the patient. Yet I venture to say that few of us have ready at hand the means to treat such accidents. The surgeon, no doubt, has his bag of instruments ready for immediate operation, but in such cases he is rarely appealed to. It is the general practitioner who usually receives the first call to the above named cases.

The medical man may be called to a case of accident or of suicide attempted by cutting or stabbing. He would probably in such a case hurriedly collect his pocket-case, antiseptics, and dressings, and happy is his state of mind when these are sufficient. The patient may, however, have lost so much blood that recovery is very doubtful, unless aided by the injection of saline solution, and this the unhappy practitioner is unable to do, because he has not brought the appliances. Tracheotomy may be required, but again the medical attendant has not brought a tube, and the patient dies before one can be obtained.

Perhaps a message is left that some one has taken poison. Not knowing what toxic agent has been swallowed, the practitioner, after placing an antidote table in his pocket, sets out for the patient's house to discover what poison has been taken. On arrival he may be told that opium has been swallowed, and so he makes use of the ordinary domestic emetics, and valuable time is lost, as the only satisfactory antidote, namely, per-

manganate of potassium, has not been brought and may not be obtainable.

It is needless to multiply examples. Unless the appropriate remedies are immediately available, the patient's life may be lost. We cannot trust to chemists to supply us with remedies, as their shops are open only during the day, and a large proportion of urgency cases occur during the night.

If, on the other hand, we are told what poison has been taken before we leave our own house, then often hurried attempts are made to select certain antidotes from a cupboard too frequently overstocked with remedial agents. In the unlikely event of our finding appropriate remedies, time is wasted in weighing out the doses of each, as one would hardly like to trust to a haphazard method of administration.

To obviate all such troubles, and to ease one's mind, I would advocate the institution in every doctor's house of the Emergency and Antidote Case. The materials for such are easily gathered together, and the drugs, with a few exceptions, keep indefinitely.

Many years ago I prepared for my own use, as well as for demonstration to my class of medical students, such a case. It was made before the employment of compressed drugs in tabloid form became general. I found that an excellent method of preserving each dose of the antidote was, after weighing it out, to cork it up in one of the small glass specimen tubes so largely employed for advertisement purposes. Each tube was labelled with the name of the substance and the dose it contained. Several doses of each antidote were prepared in this way, and the series of tubes enclosed in a small box or wide-mouthed bottle, which was itself labelled in turn. For ease in administration, it is better to group a whole class together; as, for example, one box is made to contain a series of different emetics, another various sedatives, and so on. It is wise not to rely on a single emetic or sedative, but to have several kinds of each, because the idiosyncrasy of the patient to a certain drug cannot be foretold. If, therefore, we find that a particular emetic, *e.g.* ipecacuanha, does not produce emesis after (say) two doses have been given, one ought rather to proceed with the administration of a different one, as sulphate of zinc. Harm, in the form of cardiac depression, may ensue if the emetic be not at once rejected by the stomach. In the same manner the sedative drugs exhibit a marked variation in the effects they produce on different patients. Chloral, for example, often produces great excitement unless followed by a large dose of bromide of potassium.

Having made our selection of drugs, instruments, etc., the

whole may be contained in an ordinary handbag, or, preferably, in a small box, and thus all is kept ready for immediate use. On being called to a case, instead of worrying as to what remedies ought to be taken, we have only to snatch up the emergency bag, and we shall feel sure that any ordinary case will find its appropriate remedy therein. Instead of trusting merely to one's memory, it is well to include in the outfit a printed Table of Antidotes, such as are found in many of the pocket medical diaries issued gratuitously.

Only those practitioners who have fortified themselves against such sudden calls possess peace of mind akin to that which the midwifery bag affords to the accoucheur. It is true that the case may remain unemployed for weeks together, but surely that is no argument against our being prepared for the necessity when it does arise.

Let me enumerate the contents which such a case ought to contain. Those drugs which can be obtained in tabloid form are much to be preferred. They occupy much less bulk, besides allowing accuracy of dosage without weighing. Before being administered, the tabloids should be crushed down, and, if possible, dissolved. In this way they act much more readily by neutralising the poison which has been taken. Almost all the drugs mentioned may be obtained in tabloid form.

CONTENTS OF EMERGENCY AND ANTIDOTE CASE.

1. *Emetics.*
   Ipecacuanha powder given in doses of 20 grains.
   Sulphate of Zinc, dose 30 grains.
   Tartar Emetic, dose 3 grains.
   Sulphate of Copper, dose 10 grains.
   Carbonate of Ammonium, dose 30 grains.

2. *Sedatives.*
   Chloral Hydrate, dose 30 grains.
   Opium powder, dose ½ grain.
   Potassium Bromide, dose 2 drachms.
   Trional, dose 20 grains.
   Chloroform.

3. *Stimulants.*
   Spt. Ammon. Arom., dose ℥30 to 60 diluted.
   Liquor. Ammon. Fort. (used for inhalation and in the preparation of ferric hydrate—see below).
   Caffeine Citrate, dose 2 grains, either by mouth or subcutaneously.

4. *Antidotes.*
   Acetic Acid (Glacial). In dilution, used for neutralising caustic alkalis.
   Adrenalin solution.
   Liq. Ferri Perchloridi. Used as a local hæmostatic. When diluted and mixed with Liq. Ammon. Fort., a precipitate of hydrated ferric oxide is formed. This precipitate when filtered off and mixed in water is an antidote in poisoning by arsenic.
   Magnesia, heavy, used for neutralising acids.
   Magnesium Sulphate, dose 2 drachms, used in poisoning by lead or barium.
   Nitrite of Amyl capsules, dose ℥2, by inhalation; used in treatment of hæmoptysis and in aconite or chloroform poisoning.
   Nitroglycerine tabloids, dose 1/100 grain.
   Potassium Permanganate, dose 10 grains, or 2 grain tabloids.
   Sodium Bicarbonate, dose 10 grains, used for neutralising acids.
   Tannic Acid, dose 1 drachm, used in poisoning by alkaloids.
   Turpentine (old or French), dose ℥30, used in phosphorus poisoning.

5. *Hypodermic Remedies.*
   Apomorphin Hydroch., dose 1/10 grain.
   Atropin Sulphate, 1/100 grain, used in aconite, morphin, pilocarpin, and fungi poisoning.
   Cocain Hydrochl., dose 1/6 grain.
   Digitalin, dose 1/100 grain, used in aconite poisoning.
   Ergotinin Citrate, 1/100 grain.
   Morphin Sulphate, dose 1/3 grain, used in belladonna poisoning.
   Pilocarpin Nitrate, dose 1/3 grain, used in belladonna poisoning.
   Strychnin Sulphate, dose 1/60 grain.

6. *Accessories.*
   Saline solution, saturated and sterilised, or tabloids, for making normal saline solution for intravenous or subcutaneous injection.
   Antiseptics (phenol., lysol., mercuric iodide, etc.).
   Flexible collodion.

7. *Instruments.*
   Bistouries, one or two.
   Artery forceps, two or three pairs.

Catgut in air-tight reel.
Horsehair. Adhesive plaster in reel. Needles.
Tracheotomy tube or intubation apparatus.
Transfusion apparatus with glass or metal needles.
Syphon stomach tube with funnel.
Hypodermic syringe. Gum elastic catheter.

8. *Dressings.*
Sealed aseptic packets of dressings and bandages—one or two packets of each.
Disinfectant dusting powder (xeroform, iodoform, etc.).

An emergency case made up in the manner I have described costs but little, and is, in my opinion, invaluable.

Messrs Parke, Davis, and Company have, however, lately introduced an excellent antidote and emergency case. It contains most of the antidotes which I have recommended, as well as an apparatus for saline injection, stomach tube, catheter, etc. There is ample space for instruments and dressings, and yet the case is exceedingly compact and small. At my suggestion, the manufacturers are drawing up an antidote table to indicate the method of employing the contents. I have also suggested to the firm the advisability of constructing a simple antidote and emergency case for use by the police, in cottage hospitals, and similar institutions.

Clinical Records

DISLOCATION OF HUMERUS, WITH RUPTURE OF THE AXILLARY ARTERY AND INJURY OF THE MUSCULO-SPIRAL NERVE: OPERATION: RECOVERY

By DUNCAN MACARTNEY, M.A., M.D.,

Surgeon to the Cancer Hospital; Assistant-Surgeon to the Western Infirmary, Glasgow; Examiner in Surgery to the University of St Andrews

A. B., a man of 68 years of age, was admitted to the Western Infirmary, Ward XI. (Dr Dalziel's), on the evening of 19th February, with dislocation of the humerus of the sub-coracoid variety. While in an intoxicated state he had fallen, and when taken home he was seen by Dr Inglis, of West Garden Street, who recognised that, while it was an ordinary dislocation as

regards the character of the displacement, yet that it had a special condition that needed very great care. This he judged from the fact that no pulse was to be felt at the wrist. Patient was accordingly dispatched at once to the Infirmary, where he was received by Dr T. D. MacEwan, the house-surgeon on duty. He also diagnosed the state of affairs—that the artery was occluded. With great care he reduced the dislocation, but almost immediately the appearance of a growing swelling in the neighbourhood, especially under the pectoral muscles, pointed to the presence of a ruptured vessel, most probably the axillary artery. Within half an hour I was present, and found that the arm at the shoulder was quite normal in shape, but that there was the large swelling above referred to, and no pulse at the wrist. Preparations for operation had been by this time begun, and though hurried they proved complete.

Patient was anæsthetised by a mixture of chloroform and ether, which he took very badly (he was evidently a man who had been a steady drinker for a long time). An incision four or five inches in length was made in a vertical direction, the mid-point being the prominence of the swelling just on the free margin of the great pectoral muscle. This muscle was in its axillary portion cut through, when a clot showed in the line of incision. When the presenting clot was quickly turned out a large stream of arterial blood followed. With left forefinger and thumb in the cavity I grasped all the tissues within reach, had the part cleaned, and carefully brought the tissues so held into view. Dr R. Carslaw, who kindly assisted me, grasped the gaping vessel with a pair of pressure forceps, and a ligature was applied. Other bleeding points were stopped by ligatures, when the patient's breathing stopped. After a short time, under artificial respiration, he recovered somewhat—enough to stop all the visible hæmorrhage. Further incision into the axilla was made with a view to searching for the distal end. But I had to stop, as his condition was too precarious. The wound was sutured from either end, leaving a gap in the centre just adjoining the injured vessel, and a drainage-tube was inserted, with the double object in view of, firstly, providing drainage in case our preparations had not been perfect; and, secondly, to mark the recurrence of bleeding from the distal end as soon as possible, if it should occur.

Close watch was kept on him, and dressings carefully re-applied as often as any staining appeared, but the amount of hæmorrhage after operation was never of any moment.

Day by day the pulse was felt for, but not till the eighth day was it reported as being present as a faint fluttering. About the fifteenth day I felt the faint tremor for a litttle.

The wound healed sweetly and well. The usual antiseptic dressings were applied, and the whole limb, wrapped in copious folds of gamgee tissue, laid on a pillow slightly above the level of patient's chest.

About the tenth day it was noticed that he suffered from wrist-drop. I am quite convinced that the same force which ruptured his artery over-stretched the musculo-spiral nerve, doubtless rupturing some of its fibres. At time of writing, his sensation in the parts supplied by the nerve is almost perfect, and the motile power has very much increased.

He was dismissed on 21st March with his arm in a sling, to return as an out-door patient.

On looking back on the case, I believe that rupture of the artery and injury of the musculo-spiral nerve occurred at the time of the accident. The head of the bone had luckily pressed against the proximal end of the artery and prevented the formation of the prominent sign, *i.e.* the swelling. Only when the bone was reduced the artery could empty itself and cause the swelling, which was the exciting cause of my presence at the case. It is quite easy, further, to understand how the injury to the nerve escaped notice at his admission, considering the helpless condition of a dislocated arm, either without or with anæsthetics.

On looking up the literature of this subject, of which Hamilton's book, though old, is quite the classical work, I find the following:—

"Summary of the graver accidents:—Rupture of the artery, 28 cases, most of which were known to be rupture of axillary artery. Callender, Lister, Blackman, and Korte tied the axillary artery, and the patients all died. Warren and Letievant tied the subclavian successfully. Gibson, Gunther, and Paxas, who resorted to the same operation, were unsuccessful. Nellaton tied the subclavian, but the result is not stated.

"Carruthers and Bellamy practised disarticulation, but the result is not stated. Rupture of vein alone, four cases. Price, Hailey, and Froriep's patients died. Agnew's patient was saved.

"Of the whole number, thirty-six, twenty-five terminated fatally, in four the results are uncertain, and seven recovered."

Many of these were cases in which the dislocation had existed for a considerable time; in the small minority the complication of the ruptured artery occurred at the time of the accident. In these, as far as the account shows, the patient was, like mine, in advanced years, and one of the elements in these cases was of course the brittle state of the arteries.

As a corollary to the above history, I should like to draw

attention to the method of reducing dislocations of the shoulder, which I have practised for the last fifteen years, and always successfully in recent cases. I have seen many forms of this procedure both practised and described: pulley and bandage: heel in the axilla: extension at right angles to the body; extension of the limb vertically overhead, with or without the foot on the shoulder: Kocher's plan of manipulation, not to speak of ambulance diagrams of a patient hanging himself by the axilla over a five-barred gate; but I have come across no description of the method I employ for this condition. I do not claim to be the inventor (original) of the method, because it is so simple and safe that it must have been employed from the very earliest times. And if so, which I think almost certain, I only claim to have reinvented a forgotten plan. It ought to be better known because of its simplicity.

If the patient is not under an anæsthetic, the surgeon must be stronger muscularly than the patient; if not, he must be prepared to take advantage of the patient when his muscles are off guard. If dislocation is on the right side, I shut my right hand into a conical fist, the bent fore-finger being the cone-apex, and insert that hand into the axilla. The conical shape of the so-shut hand enables me to get well into the space between the dislocated humerus and the ribs. If the left shoulder is dislocated, I use the left hand similarly shut. With the free hand I grasp the patient's arm just below the elbow, and then, by pushing hard with the hand that is in the axilla, and pulling as hard with the free hand which is grasping the upper fore-arm, the bone resumes its place without difficulty. The greater sensitiveness and mobility of the hand in the axilla is of infinitely greater value than the hard, insensitive heel, as usually employed. More, the hand can be made quite as effective a fulcrum, if leverage is wanted, by firmly contracting the muscles of the fore-arm and making a pugilistic fist. Almost unconsciously the bent fingers in the axilla "airt" the errant bone in the proper direction. I have even reduced the bone to its normal site by the extended fingers in the axilla. With the conical fist in the axilla and the free hand pulling on the fore-arm, the muscular action of the surgeon is just what is assumed in the common manœuvre of turning a rowing-boat quickly, when you "pull" with one hand and "backwater" with the other.

CLINICAL NOTES OF SEVEN CASES OF PLACENTA PRÆVIA TREATED IN THE GLASGOW MATERNITY HOSPITAL DURING THE MONTHS OF MARCH AND APRIL

By ROBERT JARDINE, M.D., etc.

CASE I. Mrs R., vii-para, æt. 34.—Sixteen days before admission this patient had lifted a heavy weight but had not felt any ill effects at the time. However, severe bleeding had come on on the following morning, and she had been confined to bed for three days. Four days after leaving her bed there had been more bleeding, and a few days later a much severer attack which had continued until admission. A midwife had been in attendance and had called in a doctor. He had found the os about the size of half a crown and the edge of the placenta sticking through it. He packed some iodoform gauze into the vagina and sent the patient into hospital.

On admission the patient was extremely collapsed, with a feeble, rapid pulse. She was very dazed and did not know where she was. Her husband stated that she had been yawning a great deal. The cervix was fully dilated and the head on the perineum. A hypodermic injection of $\frac{1}{30}$ gr. strychnine and $\frac{1}{10}$ gr. digitaline was given, and 2 pints of normal saline solution were infused under the right breast. The child, which had been dead for some time, was delivered with forceps. It weighed $7\frac{1}{2}$ lbs. There was no post-partum hæmorrhage.

The patient's temperature was up at the time of admission, and as an old woman had been in attendance we expected there would be sepsis, and unfortunately our expectations were realized. The temperature was 103° on the second day and reached 105° on the fifth day, when we had to transfer the patient to the fever hospital, where she died two days later. The treatment adopted was free stimulation, with strychnine, brandy, and quinine, and douching. The lochia remained very foul throughout.

A few weeks later the daughter of this old midwife was brought to the hospital after a doctor had failed to deliver with forceps. A craniotomy was done on the dead child. The woman was very septic, and my right forefinger was infected by her, so that I was off duty for some time. She also died after she was transferred from the hospital. I believe that both of these cases were infected by the so-called midwife.

CASE II. Mrs H., xi-para, æt. 37.—About 4 A.M. on the day of admission bleeding had begun, and continued for some hours. The patient was admitted at 10 P.M., and there was some oozing then.

The os admitted two fingers, and the placenta could easily be felt, especially posteriorly. The membranes were intact. As the cervix was quite soft and the os dilatable, bi-polar version was done and a foot brought down. Delivery was slowly effected, the after-coming head giving some difficulty. The right collar-bone was broken. The child was alive (5½ lbs.) and survived. There was not much loss of blood. The patient made a good recovery, but had three rises of temperature at different times, for which we were unable to account, as there were no indications of sepsis. The child's arm was bound to its chest, and the collar-bone united.

CASE III. J. M., i-para, æt. 25.—This patient was admitted in labour without any bleeding. The head presented and the placental border could be felt beyond the os internum. The labour went on naturally, without any bleeding. The child weighed 5½ lbs. and remained cyanosed, and died on the third day from non-closure of the foramen ovale. The patient made a normal recovery.

In this case only a small portion of the placenta was below the retraction ring, and the pressure of the head effectually checked any bleeding.

CASE IV. Mrs S., iii-para, æt. 27.—This patient had an attack of bleeding eight days before admission, and again six days later. The last attack had continued, and she was bleeding pretty freely on admission. She was not very blanched, and the pulse was only 100. The os admitted a finger, and the placenta was found to cover the os except posteriorly, where the membranes could be reached. The breech presented. The os was dilated sufficiently to allow of two fingers being passed, and the membranes were ruptured and a foot brought down. Delivery was left to nature, and was accomplished in a few hours. There was no further bleeding. The child weighed 4 lbs. It gasped for a little, but soon died.

The patient made a normal recovery.

CASE V. Mrs H., vi-para, æt. 35.—The first attack of bleeding had commenced eight days before admission, and had continued for two days. The second attack had commenced five days later, and had lasted until admission, one day later.

The os admitted two fingers, and the placenta was felt to

the left side. The bleeding was pretty profuse. The cervix and vagina were firmly packed with iodoform gauze. The packing was removed eleven hours later, and the os was a little more dilated. The packing was renewed and left in until the following day, when it was removed and delivery effected by version. The child weighed 5½ lbs. and was alive.

There was some febrile disturbance during the puerperium, and an intrauterine douche had to be given, but the patient made a good recovery.

CASE VI. Mrs C., v-para, æt. 25.—Bleeding had begun five weeks before admission, and had lasted three days. It had then ceased for a week, but had recurred every two or three days until admission. There had been no pain except when clots were passed. The patient considered herself to be between four and five months pregnant. The uterine tumour was soft and boggy, and not quite up to the umbilicus. The fœtal parts could not be felt, nor could any fœtal heart be heard.

The os admitted a finger, and the edge of the placenta could be felt at the internal os. As the cervix was soft, the os was dilated sufficiently to admit two fingers, and a foot was brought down. The fœtus was a fourth-month one and was very soft. The head was gripped by the cervix, but it was so soft that it was perforated by the finger and easily got away. There was no post-partum hæmorrhage, but there were some black clots in the uterus. The upper part of the placenta had been separated, so that there had been some concealed accidental as well as unavoidable hæmorrhage. The patient made a good recovery.

CASE VII. Mrs J., iii-para, æt. 26.—Bleeding had begun seven days before admission and had continued for a day. It had stopped for three days while the patient was in bed, but had begun again while the patient was up and had continued until admission.

On admission the patient's temperature was 100° and the pulse 120, and there was some bleeding. The fœtal heart was audible. The os admitted three fingers, and the placenta could be felt to the right side and posteriorly. The os was dilated manually and the child delivered by version. As the leg was brought down, the placenta came with it. The child was quickly delivered. It was asphyxiated, but came round with artificial respiration. It weighed 5 lbs. It died next day.

The patient had some bronchitis on admission, but she made a good recovery.

Case I. was the most serious of the lot as regards the

hæmorrhage, and unfortunately she was very septic when admitted. None of the other cases required saline infusion. I invariably use saline infusions in all cases of severe hæmorrhage, and cannot speak too highly of it. In case III. there was no bleeding, although it undoubtedly was a case of placenta prævia. In case VI. the bleeding had commenced much earlier than is usual in placenta prævia. The fœtus was only a fourth-month one, and the bleeding had commenced five weeks before delivery. There had been some separation of the upper part of the placenta, so it is quite possible that there had not been any bleeding from the lower portion at all. There was a fair amount of old clot in the uterus, which gave it a boggy feeling, and prevented the fœtal parts being palpated. The case was very like the two cases of hydatid mole reported in last month's *Journal*. Case V. was the only one in which plugging the vagina was adopted.

The death-rate in placenta prævia used to be very high, but if the cases are seen in time and properly treated the risk to the mother should not be great. The risk to the child, however, is very great, as the safest method of treating the mother is not by any means the safest for the child, but the mother's claims are paramount.

The hæmorrhage should be controlled by plugging from below by means of packing or hydrostatic bags, or from above by bringing down the breech. In no case should delivery be rapid, unless the os is sufficiently dilated to allow of the passage of the child without tearing the cervix. If there is post-partum hæmorrhage the hot douche is of very little use; in fact, I have known it bring on the hæmorrhage by washing the clots out of the sinuses. In such cases I plug the uterus and vagina very firmly, to get direct pressure upon the bleeding area. Saline injections should be used in all cases where much blood has been lost.

EPITHELIOMA OF THE FLOOR OF THE MOUTH, Removal, with Sixteen Subsequent Operations, including Removal of Portions of the Internal Jugular Vein on both Sides. Death nearly Four Years after from Septic Pneumonia.

By J. W. DOWDEN, F.R.C.S.,
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THE results obtainable by operation for carcinoma about the mouth are not very satisfactory, nor can we expect them to be so when the surgeon deals with a lesion which requires the

removal of microscopic deposits. With an anatomical knowledge of the lymphatic chains related to a given area, the results are much improved, especially when such chains are always removed, whether palpable or not.

The following case is of interest from such a standpoint, and the fact that a careful watch was kept, and surgical interference carried out on the advent of anything suspicious.

A. W., a wiry, healthy-looking man of sixty, was admitted to Mr Cathcart's wards of the Edinburgh Royal Infirmary on April 14, 1902, recommended by Dr John M'Gibbon.

On the floor of the mouth on the right side there was situated under the tongue a typical epitheliomatous ulcer about the size of a shilling, and there was the history of the discharge of calcareous material from this spot about two years previous to admission, probably from the right sublingual duct. In addition to the ulcer, leucoplakial patches were present about the mouth. No glands could be palpated in the submaxillary or submental regions.

On April 16, in the absence of Mr Cathcart, the growth was removed, and ten days later the submaxillary and submental glands, the dissection being carried as far as the carotid arteries on both sides. It was interesting and encouraging to learn that no malignant disease was found in these glands.

The patient was most attentive to directions and constantly showed himself. A few months later a fulness could be made out on the left side over the upper part of the internal jugular vein; this was removed, and proved to be a gland invaded by epithelioma. Later, some small but malignant glands were removed from over the right jugular vein high up. Of the operations which followed, the major ones need only be mentioned. A new patch of epithelioma developed in a leucoplakial area on the right lower jaw, and involved the floor of the mouth to some extent; this growth was removed by splitting the lower jaw, taking away half the tongue, the floor of the mouth on that side, and chiselling away the bone subjacent to the ulcer on the jaw. Later both posterior chains of cervical glands enlarged and were removed, but did not prove to be malignant; one, curiously, showed old tubercle. The next operation of importance was the removal of a portion of the right internal jugular vein low down in the neck, with a small but adherent malignant gland. This was the only operation where sepsis developed, and naturally caused anxiety for a time. Some months later a similar gland, with a portion of the left internal jugular vein low down, was removed. It was interesting to note that the moment the left vein was ligated, the right side of the face and neck became suffused and livid; this, however, passed

off in an hour. Unfortunately there was a recurrence of malignant disease on the right lower jaw, and a gland could just be palpated in the region of the right parotid. This gland was removed, and the half of the right lower jaw, but unfortunately septic pneumonia developed and proved fatal almost four years from the time he was first operated on, following the seventeenth operation in that period.

Such a case is of interest from the number of operations performed, and the fact that, except for the usually short periods he was in hospital he continued his employment to the last. It was certainly disheartening to face again and again recurrence of the disease, but to prolong life in comparative comfort for such a period of time was satisfactory. A lesson to be gained from this case was that the second operation performed for the first palpable gland of a malignant character was carried out on the opposite side to the primary focus, and far away from it, over the left internal jugular vein, an indication that in future the lymph glands in that region should be removed at the time the submental and submaxillary glands are cleared out.

After the removal of the primary growth, it would appear best to wait a few days before removing the lymph chain, the advantage being the greater size of the glands and the probability that any epitheliomatous cells in transit through the lymph vessels would have reached the glands and so be removed with them.

Mr Cotterill and Mr Cathcart were kind enough to ask me to perform the various operations in this case, Mr Cotterill being good enough to assist me in the last and most troublesome one.

ON LEPROSY AND FISH-EATING[1]

By G. ARMAUER HANSEN, M.D.,
Director-General of Leprosy in Norway

THE hypothesis that fish-eating produces leprosy is very old, and the author embraced it, as he tells us, from the beginning of his knowledge of leprosy, and he still holds it, though in a modified form. Mr Hutchinson is, as far as I know, the only upholder of this hypothesis nowadays.

Mr Hutchinson's arguments fall under two heads: (1) He tries to prove that fish is eaten everywhere where leprosy prevails; (2) he tries to prove that fish *per se* does not produce leprosy, but only badly cured fish, fish more or less decomposed.

[1] "On Leprosy and Fish-Eating," by Jonathan Hutchinson, M.D., F.R.S. London: Archibald Constable & Co., Ltd. 1906. Price 12s. 6d.

I shall treat these two propositions separately. As to the first, since I cannot follow the author on all his expeditions round the earth's surface, for want of knowledge, I confine myself to pointing out his errors respecting Norway. Mr Hutchinson states that leprosy prevails only on the western coast of Norway where people eat fish, and badly cured fish, but he does not mention, probably because he does not know it, that in certain parts of eastern Norway where there is no leprosy the people prepare a special form of trout, which is allowed to decompose to a certain degree before being salted. These trout have always a more or less nauseous smell, but they taste exceedingly good in the opinion of connoisseurs, and are freely exported to the towns. But none of the eaters of these trout in towns or in the country have turned lepers. Mr Hutchinson holds, too, that the dried cod exported to Portugal and Spain (he does not mention Italy) from Norway is the cause of leprosy in these countries; but he seems to think that the herring is of no importance, since he does not mention it. But if there is any fish that has been exported from Norway in a state of decomposition, it is the herring; for herring are often taken in such quantities that it takes the fishermen two or three days to salt them all, and consequently those last salted are already more or less decomposed, especially if their stomachs have been filled with food. Such decomposed herrings have often been exported to Russia and Germany, but have not produced leprosy there. Especially can this be said with certainty as far as concerns Germany and Poland. The dried cod and the salted and dried cod which is exported to the Roman Catholic lands is not decayed; the smell of these is not the smell of decomposition or of rottenness, but the smell of dried fish.

Further, the eating of decayed fish does not produce leprosy in Bergen, where such fish has often been eaten, and finally leprosy diminished in Norway, while the population was still in large measure using decayed fish as food. It is only in the last ten to fifteen years that the fisher-people have improved their taste in this respect. Thus, so far as I can see, Norway cannot be used as proof of the validity of the fish hypothesis.

As to the second point, viz., in what way decayed fish produce leprosy, Mr Hutchinson has modified somewhat the fish hypothesis in accordance with bacteriology, though he finds that bacteriology may be misleading as to the question of contagion.

Mr Hutchinson thinks, like the late Dr Danielssen, that leprosy and tuberculosis are kindred diseases, and that the lepra bacillus can be transformed into tubercle bacillus, and *vice versâ*. This, I think, is an error. There may be some resemblances, optically, between the two bacilli, but there is no similarity in

the way in which they attack the organism. Anatomically there is always a clear difference between the two diseases; the lepra bacillus never produces a caseous necrosis as does the tubercle bacillus, and though some observers have described them, I never saw a giant cell in a leproma. Mr Hutchinson is in error when he says that the lepra bacillus has not been demonstrated in the maculo-anæsthetic form of leprosy; it was demonstrated first by Dr Looft, and later more completely by Dr Lie.

Then Mr Hutchinson suggests that a ptomaine in decayed fish rouses the tubercle bacillus to differentiated activity, but he will not put aside the possibility that the lepra bacillus may exist in fish, though he does not tell us from whence it comes. He has never tried to find it in fish, and very wisely; for if he had found a bacillus like the lepra bacillus, we would be no further on, since we have no mode of culture or of experiment to ascertain its nature. But it is highly improbable that the lepra bacillus can live as a saprophyte in fish when all efforts in cultivating it are in vain.

All Mr Hutchinson's suggestions and theories as to how decayed fish produces leprosy have no basis of fact to rest upon, and are therefore, I will not say valueless, but altogether destitute of proof of the truth of the fish-hypothesis. In a disease like leprosy, when there are still so many riddles, it is true, we have no other way to go than that of hypothesis, and though Mr Hutchinson's hypothesis may be quite as good as any other, I must confess that to me it seems very poorly sustained by facts.

Mr Hutchinson treats of almost all the questions belonging to leprosy, and a complete review would take too much space. There are, however, some points on which I must say some words. While Mr Hutchinson is most willing to believe patients when they say that they never have seen a leper, he is most incredulous when they say that they never have eaten fish. I cannot imagine why the latter should lie more than the former. I, for my part, am ready to believe that they both lie. I have very often here, in Norway, met with lepers who protest that they never have seen a leper, and I have also often been able to demonstrate to them that they state what is not true. Not so long ago it would have been impossible that a man from western Norway should not have seen a leper. Though the lepers always accuse the good God for sending them their disease, they are never grateful for the gift, but rather ashamed, and this is probably the reason why they lie. Elsewhere there may be like or other grounds for their lying in this respect. When one has no belief in their denials, it is impossible to prove that there really are *de novo* cases of leprosy.

And in all the places of which Mr Hutchinson maintains that only through the fish-hypothesis can we get a rational explanation of the occurrence of leprosy, I think that a hypothetical explanation by contagion is at least as good and as probable. Mr Hutchinson does not absolutely deny contagion, and he accepts the commensal or food communication, but "the touch will not convey it, nor will the breath, nor will the clothes worn by a leper." Mr Hutchinson does not give the history of my "unfortunate discovery" of the lepra bacillus quite fully. It was after having made investigations in the country districts on the etiology of leprosy, and having found, in my opinion, very good arguments for the contagiousness of the disease that I began to search for and finally found, what I sought, the specific cause of the disease which my former studies had made me regard as a specific, in that sense of the word that its specificity ought to have a specific origin.

It was partly my observations in the country districts and partly the results of the measures taken in Norway against the disease which confirmed my belief in the contagiousness of leprosy.

As to the leprous Norwegians in the United States, it is not quite certain that "in no single instance has any contagion occurred." Professor W. Boeck mentions a case from the United States which most probably can be ascribed to contagion, and I myself found there in 1888 a case in which contagion, at any rate, could not be excluded. The reason why leprosy has not spread in the United States from leprous Norwegians is, I believe, due to the fact that the first thing the Norwegian peasant learns when he reaches America is to wash himself. All the leprous Norwegians I saw there had at least their own bed, and most of them their own room. Personal cleanliness is, I have no doubt, the best means of isolation from noxious agents coming from the surroundings, and nobody has ever thought or said that leprosy could be communicated by breath, at all events in our time. As to clothes worn by a leper I am not so confident. A man heired a pair of drawers from a leprous friend, and probably wore them without washing them; the following year he was a leper himself. A son wore a pair of stockings after his leprous father and became a leper.

As to servants in the leper asylums, a washerwoman in the asylum in Bergen became a leper, and an assistant in the baths at the Lungegaards Hospital likewise caught the disease; in neither of them was it possible to find any other reasonable cause than contagion. True, these cases are not proofs, but they cannot be cast away as being of no importance. That often, I may say in most cases, it is impossible to find the date

of the infection, is no proof against contagion, for this date lies eight or ten or more years backwards from the time when we can examine the patient, and who can remember all the details of what happened so long ago? When Mr Hutchinson argues that segregation has nothing to do with the diminishing of leprosy in Norway, he goes, I think, beyond his rights. I cannot here give all the arguments for my opinions in this behalf, but I will only give an illustration of how segregation may act.

Suppose in a given district we have 100 lepers, and that every year 10 die and 10 new cases appear, so that the number always remains 100. Now we begin to isolate: we take 10 per cent. away every coming year; we will then have the following figures. I take the year 1900 to begin with:—

In 1900,	100	lepers;	10	died	and	10	new cases	in 1905
„ 1901,	90	„	9	„	„	9	„	„ 1906
„ 1902,	80	„	8	„	„	8	„	„ 1907
„ 1903,	70	„	7	„	„	7	„	„ 1908
„ 1904,	60	„	6	„	„	6	„	„ 1909
						40		

This will give 40 new cases instead of 50, if none had been isolated. I assume that the infected in 1900 first show their disease in 1905, and so on. This is on the supposition that leprosy is contagious. And as the results of segregation in Norway almost exactly correspond to this scheme, I hold that these results are the best proof we have of the contagiousness of leprosy. As to the law of 1885, *not* 1875, my object in advocating it was that the State should concern itself more with the question of leprosy than had hitherto been the case, for the law gives the local authorities the right to tell the leper how to behave himself if he remains at home; and if the leper will not or cannot comply with the orders given him, the local authority can remove him to an asylum. This law, combined with my visits to the lepers and my continuous preaching the gospel of cleanliness and isolation of the lepers in their homes, has, in my opinion, done much good, and if "the number of those segregated declined rather than otherwise," this is due to the fact that the number of lepers is so much lower than formerly, and "more than half are" not "at their homes," but more than half are segregated. I agree that we ought to have still more in our asylums, but as our experience is that segregation does its work even if it be not complete, we see no cause for enacting such severe measures as would probably only meet with opposition in a democratic country like Norway.

I cannot show "that the fish hypothesis is not abundantly

applicable to my native land," for almost any hypothesis can supply the "special circumstances which we unfortunately know nothing of." I prefer to say that we do not know, when I have no clear idea of any possibility, and from what I have said of fish-eating in Norway during the decline of leprosy may be drawn the conclusion that I fail to find the fish hypothesis very probable.

It may be that my judgment of the fish hypothesis is narrow-minded, since I only can judge it from my knowledge of my own country; but if a hypothesis cannot hold good for all parts of the world, the hypothesis most probably can be criticised from other countries too, and if it fails in one place there is great probability of its failing everywhere. But it must be acknowledged that Mr Hutchinson has put forth the arguments for the fish hypothesis with great force, as was to be expected after a lifelong study by a keen intellect.

Births and Deaths registered in Eight of the Principal Towns of Scotland during May 1906.

DURING the month of May 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4410 living children; of whom 2217 were males, and 2193 females. These births are 22 more than in April, but 401 fewer than in May of last year. The births are equivalent to an annual birth-rate of 29.1 per thousand of the estimated population of these towns, a rate which is 0.8 less than that of last month, and 3.3 less than that of May of last year. The birth-rate of the month ranged from 39.3 in Greenock to 18.1 in Perth. In Glasgow it was 30.8; in Leith, 29.5; in Dundee, 28.9; in Aberdeen, 27.3; in Edinburgh, 25.7; and in Paisley, 25.3.

Of the total births, 306, or 6.9 per cent., were illegitimate. The rate of illegitimacy was for the month highest in Dundee, 7.7, and lowest in Greenock, 4.7. In Perth it was 7.5; in Glasgow, 7.2; in Aberdeen, 7.1; in Edinburgh, 7.0; in Paisley, 5.9; and in Leith, 5.3.

Deaths registered in these towns during the month numbered 2734, 1409 being of male persons, and 1325 of female persons. These deaths are equivalent to an annual death-rate of 18.0 per thousand, a rate which is 0.7 less than that recorded for the previous month, and the same amount less than that recorded for the corresponding month of last year. The deaths registered during the month are 11 fewer than in April, and 45 fewer than in May of last year. The death-rate of the month

was highest in Greenock, 19.8, and lowest in Aberdeen, 15.0. In Glasgow it was 19.3; in Dundee, 18.1; in Edinburgh, 17.2; in Perth, 16.7; in Paisley, 16.2; and in Leith, 15.7. In Glasgow, Aberdeen, and Perth the rate was higher than the corresponding rate of April; in the remaining towns it was less.

Of the 2734 deaths registered, 923, or 33.8 per cent., were of children of less than five years old; and 680, or 24.9 per cent., were of persons of over sixty. The former are 48 more than in April, but 95 fewer than in May of last year; the latter are 72 fewer than in April and 1 fewer than in May of last year.

Deaths of children of less than one year old numbered 527. These are 19 more than in last month, but 34 fewer than in the corresponding month of last year, and are equivalent to an infantile mortality of 126 per thousand births. The highest infantile mortality rate for the month occurred in Dundee, 161, and the lowest in Perth, 43. In Greenock it was 154; in Leith, 136; in Glasgow, 128; in Edinburgh, 120; in Aberdeen, 101; and in Paisley, 100. In Glasgow, Dundee, Leith, and Greenock this rate was higher than in the previous month; in Edinburgh Aberdeen, Paisley, and Perth, it was less than in that month.

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There were no deaths from small-pox recorded in these towns during the month. Deaths from measles numbered 82, which is 1 fewer than in April, and 50 fewer than in May of last year. Deaths from scarlet fever numbered 12, which is 5 more than in April, and 2 more than in May of last year. Deaths from whooping-cough numbered 82; these are 15 more than in April, but 40 fewer than in May of last year. Deaths from diphtheria numbered 21; from enteric fever, 5; and from epidemic cerebro-spinal meningitis, 5; these last being registered in Glasgow. Deaths from diarrhœas numbered 27; they are 2 more than in April, but the same number as in May of last year.

There were 14 deaths ascribed to influenza, which is 6 fewer than in April, and 2 fewer than in May of last year.

Deaths from puerperal septic conditions numbered 8; from malignant disease, 135; of which 68 were ascribed to carcinoma, 6 to sarcoma, and 61 to cancer not otherwise described. Deaths from heart disease numbered 246; from apoplexies, 149; from premature birth debility, 89; and from alcoholism, 9.

Deaths from pneumonia numbered 310, and constituted 11.3 per cent. of the total; while those from bronchitis numbered 199, and constituted 7.3 per cent. of the total. Deaths from pneumonia are 52 fewer than in April, but of the same number as in May of last year; those from bronchitis are 38 fewer than in April, but 28 more than in May of last year.

Deaths from tuberculous diseases numbered 399, and con-

stituted 14.6 per cent. of the total; they are 44 more than in the previous month, but 1 fewer than in the corresponding month of last year. Of them 265 were ascribed to phthisis.

To violent causes 110 deaths were ascribed; of them 4 were suicidal, 3 being by hanging, and 1 by drowning.

Of the persons whose deaths were registered during the month, 2 males and 7 females were aged 90 years and upwards. The oldest of them was a widow aged 98.

Meeting of Society

Edinburgh Medico-Chirurgical Society

THE ninth ordinary meeting was held on June 6th, Dr J. O. Affleck, President, in the chair.

Drs Gibson and W. T. Ritchie showed a series of tracings from cases of heart-block.

Mr Caird showed four examples of intestinal carcinoma removed from the pelvic colon and rectum.

Mr David Wallace showed a gall-bladder and calculi from a case of septic cholecystitis.

Dr W. T. Ritchie, for Dr G. A. Gibson, showed a case of symmetrical trophic lesions of both thumbs without definite symptoms of syringomyelia.

Mr Wallace showed a patient after cholecystectomy for septic cholangitis.

Mr Stiles exhibited two children after operation for Hirschsprung's disease. In one case an artificial anus had been made two years previously with excellent results. In the second case the ileum had been joined to the descending colon with a view of leading the more liquid contents of the small intestine into the affected part. Three and a-half weeks had elapsed since the operation, and the case showed improvement.

Dr Aitchison Robertson demonstrated a new antidote and emergency case.

Dr A. H. H. Sinclair read a paper on the Early Diagnosis of Glaucoma by Bjerrum's Screen Test. By this method slight relative defects of vision in the central portion of the field could be detected. The relationship of this area of relatively defective vision to the blind spot of Mariotte was constant in glaucoma, and was a characteristic and an early symptom.

Mr Berry referred to the difficulty in carrying out the test, but emphasised its value.

Dr Paterson said the test made the diagnosis of glaucoma

easy to the expert, but did not put an easy method within reach of an unpractised observer.

Mr David Wallace, C.M.G., read a paper on tumours of the bladder. After referring to the operation mortality and the difficulty in dealing with certain cases, Mr Wallace insisted on the great advantage which would accrue from early operation. Cystoscopic examination was of great value in diagnosis and prognosis. He concluded (1) that in cases which did not promise the likelihood of cure operation should be delayed till the symptoms became distressing or dangerous; (2) that operation was indicated when the patient was suffering from septic absorption; (3) that operation prolongs life when hæmaturia is frequent and is leading to loss of strength; (4) that operation is indicated in cases where frequency of micturition prevents rest and sleep.

In all cases suprapubic cystotomy is the best operation. A permanent fistula gave little trouble when an apparatus was properly fitted.

The President thought that one of the reasons why tumours of the bladder were not seen by the surgeon in early stages was the long interval that might elapse between attacks of hæmaturia.

Mr Caird said there was no doubt about the general proposition that operation should be early, but added that the prognosis was a matter of the very greatest difficulty.

Editorial Notes and News

The Vivisection Question.

WHEN the Minister of Education, strolling in Battersea Park in profound meditation, found himself assailed by hundreds of children all filled with a burning desire to know the time, it does not seem to have occurred to him to take advantage of the opportunity to discover how the problems of education presented themselves to some of the people most concerned. Yet we can vouch for the fact that many children have very definite opinions, founded upon a practical acquaintance with the schools, opinions not altogether unworthy of a politician's consideration.

Vivisection is almost as burning a question as religious education, and now that the Government has announced the intention of appointing a commission to inquire into the Vivisection Act, we may express the hope that the commissioners will be guided by the sober common-sense of men of balanced

judgment, and will not pay too much heed to extremists at either end of the scale.

What is the general opinion of the medical profession on this subject? We cannot speak authoritatively on the matter, for we know that here as elsewhere doctors differ. But we think we are pretty safe in saying that the average member of "this strange medical and surgical profession," to adopt the phraseology of Mr Bernard Shaw, will be found to side neither with the total abolitionists nor with those who cry aloud for the removal of all "restrictions" on scientific research.

The defence of vivisection rests upon its utility. No one who knows and comprehends the facts can doubt that a very great deal of our present knowledge of physiology and pathology, a great deal of the knowledge upon which the physician daily rests the diagnosis and treatment of his patients, is due to experiments upon animals. Anti-vivisection extremists, of course, still as of old maintain that no knowledge of any value ever has been or ever can be obtained by such experiments, but if their voices are as loud we doubt if their faith is as robust as of old. We seem to notice an increasing tendency to lay stress on the moral aspects of the question, and to avoid discussion of what science owes to the practice. Mr Stephen Coleridge, for example, at a recent meeting of the National Anti-vivisection Society, referring to the proposed commission, said, "If the inquiry is to be directed simply and solely into the question as to whether science is advanced by this detestable practice or not, I will have nothing to do with the inquiry, and it will be perfectly abortive so far as our movement is concerned."

If it is idle to deny that science has been advanced, and very materially advanced, by experiments on living animals, it is equally idle to deny that the practice has sometimes been abused. Experiments, the results of which had been established beyond all question, have been frequently repeated; and certain experimenters, a very small minority no doubt, have been too indifferent to the suffering which their investigations might involve. It is therefore possible, without going beyond the bounds of truth and reason, to bring a strong indictment against vivisection on two important grounds: first, that the practice involves suffering on the part of the animals experimented on; and secondly, that habitual experimentation may lead to a blunting of some of the higher attributes of man.

Can vivisection then be justified? Surely, it may be said, the moral arguments are all against the practice. Granting its utility, dare we argue that we may do evil that good may come of it?

In our opinion the question cannot be answered by a

categorical yes or no. The assumption that the moral arguments are all on one side is quite gratuitous. The experimenter is surely entitled to the argument that utility which may mean a diminution of human suffering and a saving of human life has in it a moral element; that it might even be immoral to refrain from experiments which gave promise of such a result.

Any discussion on the ethics of vivisection should take into account the different classes of experiment which may be performed, and the amount of suffering involved. Without some such classification discussion may go on endlessly, without any one modifying his opinion in the least degree. As a basis of discussion it must be decided whether or not man has any rights over the animal creation at all. If he has none, then of course no kind of vivisection can be justified on any grounds whatever. But even anti-vivisectionists seldom adopt so extreme a view as this. Few belong to the same company as the priest who was so tender hearted that—

> "Though his cassock was swarming
> With thousands of vermin
> He would not take the life of a flea."

Many are not even vegetarians. Some, we fear, array themselves in furs and feathers, and we have heard of some indulging in such sport as grouse-drives.

Now if man has a right to deprive animals of their life for his own purposes, it seems difficult to deny him the right of performing experiments which involve the taking of life but not the infliction of pain. In a very large class of experiments the animals used are placed under an anæsthetic before the experiment is begun; they are kept unconscious during the whole time of the experiment; and they are killed without consciousness being regained. The ordinary vivisector's licence permits experiments of this kind only, and it does not seem possible to find any logical argument against such experiments if we admit the assumption referred to above.

But we are upon other ground when we turn to the consideration of experiments involving suffering. Here a distinction may be made, in the first place, between the higher animals, which presumably are sensible to pain, and the lower animals, which are sensible to pain only to a very low degree if at all. We do not, of course, know the extent of sensibility possessed by the lower invertebrata, but that we are very confident that it is very slight is shown by the fact that the Vivisection Act provides no protection for these creatures, and that Mr Romanes's account of his highly ingenious mutilations of living jelly-fish and sea-urchins was published as a text-book in a popular series of scientific handbooks without raising any outcry from the public.

The case of painful experiments upon the higher animals is more difficult. Here again we would draw a distinction—this time between experiments performed with the definite expectation of advancing knowledge, and experiments performed in repetition of some whose conclusiveness is acknowledged. The latter obviously require much more justification than the former. Again, a distinction should be made between experiments physiological and experiments pathological. Many of the former class have only a very indirect bearing upon human welfare, and consequently need more justification than others whose bearing is more direct. And here we would utter a word of protest against the common description of inoculation experiments as "mere pin-pricks." These experiments, if they are successful, do involve sickness and possibly suffering, and to describe them as merely pricks is not only somewhat disingenuous, but is a needless playing into the hands of the enemy.

Experiments on living animals, then, obviously belong to a number of different categories, and require different degrees of justification. This is distinctly recognised in the different schedules of the existing Act, which was obviously intended to prevent the abuse of vivisection without unnecessarily hampering scientific research. With such an aim we believe the general opinion of the profession will be found in cordial agreement.

Medical Education. THE report of the Examination Committee of the General Medical Council, which has been sent to each of the licensing bodies for their information, contains a great deal of interest, and will no doubt be carefully considered by them all. With most of the suggestions we find ourselves in cordial agreement, though all will recognise considerable practical difficulties in carrying them at once into effect.

Recommendations 6 and 11 refer to the desirability of ophthalmology being universally adopted as a part of the qualifying examination, and specially commend the Irish Boards, which require such an examination. The inspectors differed in their views as to the value of an examination in operative surgery, but the committee are of opinion that it is of value in leading the student to devote more time to practical surgical procedure.

Paragraph 15 is, in our opinion, the most valuable of all the suggestions. It is that the clinical examination should take place some months after the systematic part of the final. If this plan were adopted it would go some way to recover what we may describe as the "lost" fifth year, which was

specially designed for clinical work, and we have no doubt the various licensing bodies will carefully consider its feasibility.

The recommendation of an examination in ophthalmology raises the very large question of examination in all the special subjects. It would, of course, be possible to do this, but we question whether it is expedient or desirable. It would be manifestly unfair to reject a student who had passed a satisfactory examination in medicine, surgery, and midwifery, because his knowledge of some special subject was not up to the examiners' standard, which would naturally be fairly high. If the optional subjects were grouped, *e.g.*, if for five of them one hundred marks were allotted, and an aggregate of fifty required, it would still be possible for the student to ignore altogether at least one. In our opinion the better plan is the one suggested by Principal Mackay at a previous meeting of the Council of instruction without examination.

If each student were required to present what is known as a D.P. Certificate, that he had *duly performed* the work of the class, the teachers might be asked to make the conditions for the certificate a little stricter, and some knowledge at least of each subject would be assured.

The Teaching of Midwifery.

ANOTHER report of great importance has been sent down without comment by the General Medical Council to the licensing bodies. The *Students' Practical Midwifery Committee* has prepared a most interesting report, and has formulated a series of recommendations which might have emanated from a committee of teaching obstetricians in Utopia. Reference to the constitution of the committee, however, discloses the fact that, with the exception of the chairman (Sir John Williams), none of the members are or have been concerned with the teaching of obstetrics. Four are professors or ex-professors of medicine, one of anatomy, and the remaining member is a general practitioner. The report therefore demands very careful consideration. It is plainly a condemnation of the present system, and the recommendations involve sweeping changes, changes which in the majority of medical schools we can see no possibility of carrying out. The editor of the *British Medical Journal* has pointed out the impossibility of carrying them out in London, and, short of adding another year to the curriculum, we do not see how they could be carried out in Scotland.

We cordially approve the recommendation that before taking out his cases the student shall have attended lectures on midwifery, as we believe he usually does, and we have before

indicated our approval of a month's residence in a maternity hospital. But the acceptance of the recommendations would compel all the students to take out, in addition, twenty cases in their last winter session, and the supply would everywhere fall short of this demand.

It seems to us that a month's close attendance on the practice and teaching of a hospital is much more in accord with the spirit of modern medicine, and that the knowledge thus gained would be of more value than the experience of twice twenty cases.

We are entirely in sympathy with the desire to improve the teaching of midwifery, and perhaps the committee are only following the example of those legislators who propose more than they have any hope of achieving, and thus have a margin for graceful concessions.

Infantile Mortality.

A FEW days ago there was held in London a National Conference on the subject of Infantile Mortality.

Their Majesties granted their patronage to the undertaking, the President of the Local Government Board acted as President, the names of very many eminent men and ladies in all parts of the country appeared in the official lists, and some 400 or 500 keenly interested ladies and gentlemen took part in the meetings. In the main, indeed practically in their entirety, the discussions were maintained by public health authorities, and were conducted along lines relating rather to public health procedures than to the various procedures of medicine proper. The question has recently, owing to its outstanding importance, been taken up so hotly by public health authorities, and in so many parts of the country more or less successful attempts are being made by them to mitigate the present appalling mortality, that in a short Conference, covering the space of two days, it was perhaps thought inadvisable to extend the scope of the discussions.

But surely it was very remarkable that not one single paper was read on the subject of Infant Feeding! Have the public health authorities of this country reached such a pitch of excellence in their knowledge of the subject as to render discussion of it unnecessary, or do they leave the elucidation of the question to their practising medical confrères? Presumably the latter; but surely to fight successfully against infantile mortality a union of forces is indispensable.

Public health authorities can do much, are doing much, and will do more; but for entire satisfaction the whole-hearted,

intelligent, and at least moderately skilled co-operation of the great mass of practising physicians must also be obtained.

From the speakers at the Conference we heard the unfortunate infants fully exonerated from all blame in connection with their unhealthiness, the fathers rather kindly ignored by all, with the exception of one lady, and the whole weight of guilt thrown on the unfortunate mothers, as the victims of various maleficent sociologic conditions, or as the ignorant or deliberate primary causes of the pitiful condition. To no one did the idea appear even dimly to occur that any blame or reproach could be cast on practising medical men. The soundness of their knowledge, and the value of their advice on this—perhaps, one might venture to call it somewhat delicate—subject were taken as beyond doubt and almost without price.

Is knowledge of the subject of infant feeding in very truth such a distinguished asset of the medical practitioner? In the experience of the great majority of men deliberate cruelty by the mother to the child is extremely rare, and if she be approached in a friendly, sympathetic manner, if the condition of affairs be tactfully discussed, and if she be shown the advantages resulting from a definite line of treatment or method of nutrition, carefully explained and entailing little additional work, she very quickly realises the benefits accruing, and loyally, so far as she can, carries out the instructions given. To attain this result it is undoubtedly absolutely essential that we ourselves have clearly before us the needs and capabilities of the healthy and the ailing infant, but more so is it necessary that the instructions be minute and in detail to the very smallest point, and that they be given in a manner suitable for ready comprehension by a mind untutored, maybe irresponsive, and at first, perhaps, somewhat sceptical.

Experientia docet. The young untried graduates are those who presumably work most among the class of people in whose midst occurs this gigantic mortality, and, consequently, from the first they are important potential educational centres on this subject. Only too often, however, these young graduates of our universities are launched into active practice with, shall we say? somewhat inadequate knowledge on this subject. Minute detailed instructions suitable for each case are essential, and such instructions are only possible where knowledge of the subject is exact, and more or less wide. Our drug prescriptions for adults are exact and detailed, and the man in doubt at least has it in his power to do no harm. No less exact and detailed are the instructions for the nutrition of her infant, which we owe to the mother; but here we suffer under the disadvantage of being unable to sit on the fence. For good or for evil advice must

be given at that very period of life when a physiological existence is most essential, when errors are most harmful and far-reaching, and when the smallest mistake is attended with the direst results. The young graduate, with only vague and hazy ideas on the subject of infant feeding, is in the great majority of cases incapable of giving accurate detailed instructions, and consequently is somewhat loose in his advice. The mother responds by carrying out his instructions more loosely still, and the resultant effect on the infant's vitality is consequently considerably more tempered by chance and good luck than at first sight seems altogether desirable.

The great increase within recent years of the numbers of proprietary foods for infants bears eloquent testimony to the inexactitude existent in food prescribing, the uncertainty on the part of the prescriber, and the prevalent tendency to regard as unimportant, concessions to whims of the parents or the dictates of fashion. The necessity of holding a National Conference on the subject of Infantile Mortality must be sufficient to arrest the attention of every thinking man, and more especially every medical man. Is everything with us as it should be, and are we on our part doing all that we can to counteract this evil? Surely we are not. Graduates leave our University and disseminate the wide world over the knowledge acquired in Edinburgh, who maybe never in the course of their existence examined an ailing child, never listened to instruction on the subject of infant diet or infant hygiene, and who, consequently, are unfitted to act as guides or preceptors of infant treatment, or to bear satisfactorily the responsibility of superintending cases of disease in infancy.

Unfortunate it is for the graduates, unfortunate for numberless infants, and unfortunate for the maintenance of the reputation of the Edinburgh Medical School that such should be the case. And as in Edinburgh, so throughout the country; the subject of pædiatrics is optional in the curriculum, and consequently presumably a minor one and unimportant to the general practitioner!

A process of devolution is occurring in medicine, and special branches are many and varied; but while many of these subjects have strong claims for compulsory inclusion in the curriculum, in the case of no other subject is the matter one of such urgent necessity.

Edinburgh in the past has led the van in medical educational matters, and the Edinburgh Medical School of to-day and of the future will but respond to the responsibilities of her traditional position by permitting no graduate to leave her gates without a sound knowledge of the subject of pædiatrics.

Sir Henry's Portrait. A VERY large number of his old pupils have indicated their intention to join in the presentation of his portrait to Emeritus Professor Sir Henry Littlejohn. We understand that the committee's arrangements would be facilitated if gentlemen will send their cheques—limited to one guinea—to Mr R. N. RAMSAY, Royal Bank, Forrest Road, Edinburgh.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

By G. LOVELL GULLAND, M.A., B.Sc., M.D., F.R.C.P.,

Physician to the Chalmers and Royal Victoria Hospitals; Assistant-Physician to the Royal Infirmary, Edinburgh

THE CONFUSION BETWEEN MUCO-MEMBRANOUS TYPHLOCOLITIS AND APPENDICITIS

IT has probably happened to most of us to see or hear of patients whose appendix has been removed, and to have found the organ perfectly healthy after its removal.

Dieulafoy, in a recent paper (*Presse Médicale*, May 30, 1906), has focussed his experience, and has narrated a number of cases interesting in this connection. He avows himself as one of the keenest possible partisans of surgical intervention in the treatment of appendicitis, and declares that the more he sees of it, the more satisfied he is that this is the only efficacious and rational treatment; but he is distressed at the number of operations which are done for non-existent appendicitis, and he brings forward the subject in order to get the sense of the profession on the matter. He quotes in detail eleven cases, some of which I may briefly summarise.

He was called in consultation to see a young man who had long suffered from a muco-membranous colitis. He was suffering great pain, with sickness and vomiting, and with the passage of large quantities of membrane. He noticed the usual cicatrix in the right iliac fossa, inquired the cause, and found that the patient had been operated upon for appendicitis, and that his crises of colitis had not been in any way modified by the operation. Several other cases had the same history. In some others still, the patient was operated on against Dieulafoy's advice, and the appendix was found to be perfectly normal.

In addition to cases observed by himself, he quotes numerous others reported by colleagues and friends. He sums up the errors of diagnosis which are made in this way, by saying that there are patients suffering from a muco-membranous or sandy entero-colitis, in whom the typhlitis is the dominating lesion. In such cases the pain is most acute in the right iliac fossa.

Then, because the members of the profession have been told again and again that appendicitis is a frequent result of entero-colitis, they are very apt not to recognise the typhlitis, and to operate, or to advise operation, for a non-existent appendicitis. He describes very carefully the course of events in such a case. One is called to a patient who complains of violent abdominal pain. He knows that he has a crisis of colitis, as he has probably already suffered several times from such attacks. He knows also that his condition is not serious, but he is suffering great pain and he asks you for help. You examine the abdomen methodically; you find it very sensitive, especially along the line of the colon, and when you reach the right iliac fossa the patient cries out because your pressure in that region produces a more acute pain than anywhere else. Then, if you have been impressed by the regrettable doctrine that appendicitis frequently follows on entero-colitis, you fall into the error of diagnosis which was spoken of before—you fail to recognise the typhlitis, and announce to your patient that his condition is complicated by appendicitis. You tell him of the danger which he incurs, you speak of operation, and ask for a consultation with a surgeon. There is great emotional disturbance to the patient and to his family. However, the operation is decided upon. According as the surgeon is, or is not, a temporiser, the operation is done a little earlier or a little later; but when the abdomen is opened your diagnosis is overturned—the appendix is healthy, the typhlitis has been taken for appendicitis, and your patient ought not to have been operated upon. But the last word has not yet been said. It is here that the microscope intervenes, and we now see arise a new variety of appendicitis—the histological or microscopic—which is going to save the diagnosis and the situation.

Many observations of this kind have been published, where the histological examination of the appendix has the unjustified pretension of being substituted for every other means of diagnosis. The principal histological appearances which are decorated by the name of appendicitis, are the presence of fibrosis, hypertrophy of the follicles, and hæmorrhagic folliculitis.

These histological appearances have nothing like the significance which has been given to them. To convince one's self

of this, it is only necessary to read Letulle's work. If one takes haphazard the appendices of adults who have succumbed to almost any disease, it is extremely rare not to find in these organs zones of sclerosis, or a thickening of the follicles, especially in the lower segment of the organ. These are trifling modifications, and have no pathological significance, though some have gone the length of calling them by the special name of Folliculitis. The hæmorrhagic folliculitis which is described in a large number of observations is simply produced by the surgeon in the course of operation. Letulle says on this subject: "I have never found hæmorrhagic folliculitis except in appendices which have been removed by operation. They are probably to be explained by the ligature which is applied to the organ before it is removed."

One must, moreover, consider the after-history of these cases of colitis in which the appendix is removed. The operations do no good and do not modify the course of the disease at all. Many authors have maintained that colitis is kept up or provoked by an inflammation of the appendix, and they consider further that the ablation of the appendix is the means of curing the colitis. Dieulafoy's experience has been that, except for some neurasthenics who declare that their pains are relieved, a muco-membranous colitis follows its course after, as it had done before, the operation. All the patients whom he has seen who had been operated on continued to have their attacks after as before. Dieulafoy points out that such errors of diagnosis may have a very bad effect on the lives of many people attacked by a typhlocolitis. Their doctors talk to them about appendicitis, and they are allowed to have a glimpse of operation. From that point onwards they become melancholy, morose, neurasthenic; they are fastidious about the choice of their food, they become thin, they constantly watch their iliac fossa, a little constipation frightens them; they pass through all the stages of desiring and fearing the operation, and their existence becomes embittered by the possibility. Dieulafoy's enormous experience in cases of colitis has enabled him to soothe and cheer many sufferers of this kind. He considers that the means of facing the difficulty is to be sure first of all of one's diagnosis, and to endeavour to remember that there is such a thing as a cæcum and such a thing as typhlitis, both of which facts appear to have been forgotten; and one must also get rid of one belief which is current in the profession, which is, that appendicitis is a frequent consequence of typhlocolitis. The co-existence of true appendicitis and typhlocolitis is among the rarest of conditions. If by chance such a co-existence did occur, the

diagnosis would be difficult but not impossible, and of course the operation ought then to be done.

From my own experience I can fully confirm Dieulafoy's main conclusions. I have seen the appendix removed in cases of typhlocolitis in which the course of the disease was not affected by the operation. I have succeeded in persuading some other patients attacked with the same disease not to have their appendix removed—a persuasion which is often difficult nowadays, when every patient who has any abdominal pain concludes at once that he has appendicitis and demands operation; but, on the other hand, I have seen some cases which appeared to be typhlocolitis and were in reality due to the appendix—one of these occurred quite recently in the person of a young man who had had dysentery and various other ailments in India, finishing up with an attack of what was considered to be appendicitis. The appendix was removed some years before, and since that time he had suffered from attacks of pain in the right iliac fossa and all along the line of the colon. He first came under my observation about a year ago. He had tenderness all along the colon, and especially in the right iliac fossa. I came to the conclusion at that time that he was either suffering from a colitis or some adhesions about the stump of the appendix. He was averse to another operation, and it was decided to treat the condition as a colitis. This was done for some time without any benefit whatever, and ultimately it was agreed to open the abdomen again in order to see what the condition of the appendix actually was. It was then found that the organ had not been removed in the fashion which is regarded as desirable north of the Tweed, and that a number of adhesions had formed round the stump which were binding down the cæcum. These were freed, and the patient was relieved, not only of his pain in the iliac fossa, but also of his tenderness along the colon and of his attacks of pain.

As far as my experience goes, I doubt whether a mucous colitis is as often diagnosed in this country as it ought to be, and I consider it extremely probable that many cases of mucous colitis are operated on for appendicitis, though I do not think that it is as a rule the surgeons who are to blame for this. It is probably most frequently the patients, and next the physicians. It has become so simple a matter to open the abdomen that many people resort to it as a diagnostic procedure in order to help out want of care or want of knowledge. Many of these cases of colitis demand the most thoughtful study, both as regards diagnosis and treatment, and it is necessary to have a large knowledge of them in order to appreciate the different varieties which occur. One cannot

blame the surgeon for opening the abdomen when he is told that the patient is suffering from appendicitis or has suffered from it, and it is the duty of the practitioner to make sure of his diagnosis before he calls in the surgeon.

The lay public is already beginning to wonder at the extreme frequency of appendicitis; and if they realised in what a number of cases appendicitis is purely histological, their wonder would probably be greatly increased.

SURGERY

By A. A. SCOT SKIRVING, C.M.G., F.R.C.S.,
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INDICATIONS FOR OPERATION IN HEAD INJURIES

AT the meeting of the Boston Society of Psychiatry and Neurology on November 16, 1905, papers were contributed on the above subject by Sachs of New York, Morton Prince of Boston, and Bullard of Boston. A full report of these papers is published in the *Boston Medical and Surgical Journal* of February 15, 1906, from which the following summary is taken.

To surgeons special interest attaches to Sachs' utterances as representing the views of an eminent physician. In his remarks he excluded the subject of fractures of the base. Sachs considers that the question of operation in head injuries has been too much left to the decision of the surgeon, and urges the collaboration of the neurologist in many cases. "If the vault of the skull, more particularly in the parietal region, is severely injured, if there is evidence of continuous bleeding from the middle meningeal artery, the purely neurological considerations must yield to surgical doctrines. Under other conditions it is the neurologist, or at least the surgeon equipped with neurological skill, whose counsel should prevail." His experience in consultation with many of the prominent surgeons of the day had taught him that the performance of cranial operations was less difficult than the decision whether to operate or trust to Nature. He did not wish to limit the surgeon's powers of "exploiting the brain," or to clip his wings, but was anxious "to establish a few principles by which his fortunate therapeutic powers can be directed into the proper channels." Sachs expressed himself dissatisfied with the present state of cranial surgery, and evidently considers that surgeons might do a great deal better. "When drainage of the

cranial cavity will be as well understood as is that of the pelvis and abdomen, and when surgeons will learn to handle the brain as well as they have learned to handle the intestines, surgical statistics after brain injury will be far better. Surgeons have not given as close study to the needs of the brain as they have to those of less dignified parts of the organism. In the mere matter of maintaining the natural heat of the brain, the surgeons are not nearly as careful as they are when they handle the gut. It would be well if they took Horsley's hint that during every operation on the brain, the natural heat of the brain must be maintained." Horsley, in his opinion, was almost the only surgeon who paid attention to this.

In the discussion which followed, Lund thought it was hardly fair to take surgeons to task for not doing such progressive work inside the cranium as in the abdominal cavity, and maintained that the conditions were such that cranial surgery could never be brilliant. In the abdomen the tissues could be handled and stitched with safety, whereas the brain was soft and gelatinous. Further, manipulative efforts were apt to result in paralyses, which sometimes produced results worse than those which it was attempted to cure. It was, of course, another matter where operations only involved the skull and dura.

On the vexed question of concussion and contusion of the brain, Sachs considers that the matter is one of degree only, and that we cannot expect it to be otherwise if the experiments of Schmaus on the spinal cord of animals are borne in mind.

With regard to the loss of memory for events occurring shortly before the time of the accident, not infrequently noticed in convalescents after cranial injuries, Sachs is doubtful whether this is ever actually made good. In instances where it apparently is, he is inclined to suspect information picked up subsequently from friends or attendants. The following are some of Sachs' conclusions :—

1. In determining the gravity of brain injuries, disturbances of cardiac and respiratory action, of vesical and rectal control, and the condition of consciousness were the most important points. Recovery from coma, however slight, was encouraging; deepening coma was of grave significance. The condition of the pupillary reflexes he considered of no special value in deciding the question of interference.

2. If the external injury pointed to one site and the symptoms to another, consider both ; the site of external injury should be attacked first, but an attempt should be made to reach the other as well.

3. It was useless to continue the discussion of the differentia-

tion between concussion, contusion, and compression. It was much more important to determine whether the brain had or had not been tangibly injured, and if so, whether the injury was accessible or not. If the latter, simple trephining might be resorted to if there were symptoms of increasing intracranial pressure, which could not be relieved by lumbar puncture or other simpler methods. Lumbar puncture he considered also valuable for diagnostic purposes.

4. It was well to remember that hæmorrhages are sometimes absorbed, and that inflammatory processes may recede spontaneously.

5. Even if years had elapsed since the initial injury, operation was indicated if symptoms pointed to an accessible lesion.

Morton Prince criticises many of Sachs' remarks. For him, apparently, the presence of a neurological colleague is little short of an embarrassment. "We have been accustomed to hear, of late years, a good deal about the neurological indications in head injuries, the general implication on the part of the neurologist being that we can rely upon the neurological findings to determine both the character of the injury to the brain and its localisation. These assumptions are usually meekly accepted by the surgeon as the dicta of a mysterious science. A good deal of this, I am afraid, has come to be little more than neurological cant." In support of this, he points to the large proportion of head injuries where there are only general symptoms, *i.e.* no neurological signs of a specially localising character, and says that all surgeons who have had large hospital experience will find this statement is borne out by their case records. To this, however, the neurologist might perhaps reply that, if he was permitted to see more cases, a larger number of cases with neurological signs might be forthcoming.

Prince, further, emphasises the rarity of fractures of the vault alone, *i.e.* without fracture of the base as well, in cases sufficiently severe to implicate the brain. Quoting a paper of Dwight (*Boston Hospital Reports*, 1894), he refers to a series of 146 fatal cases of skull fractures studied by Dwight, in only six of which was there found a fracture of the vault alone. Even although these were fatal cases, Prince considers that an inference can justifiably be drawn with regard to non-fatal cases. As an instance of the unreliability of clinical signs, it was interesting to note that, in 31 per cent. of fractures of the middle fossa in the same series, no bleeding from the ear had occurred. In 29 per cent of all the cases, branches of the middle meningeal artery had been ruptured. Out of 138 fatal cases examined by Dwight, in only 22, or 14 per cent., was there no laceration of the brain. This explained to a great extent the high mortality

in cases of hæmorrhage, even when a clot is discovered at the operation and removed. Prince also recognises that simple œdema may occasionally cause paralysis, and so simulate the presence of a clot or of laceration.

Bullard, in his paper, advised operation in the following cases of head injury, "unless special contra-indications existed":—In all depressed fractures; in all compound fractures of the vault; even in linear fractures without any depression. He does not, however, state what he would exactly do in dealing with the latter, and his grounds for operation are apparently that "we can never be certain that epilepsy or some other serious consequence may not follow such an injury."

In cases where cerebral symptoms are present, but where fracture is only suspected, he considers the following are indications for operation, provided the symptoms are clearly due to traumatism:—(1) Unconsciousness coming on after an interval of consciousness; (2) unconsciousness lasting for more than twelve hours; (3) persistent unilateral convulsions in cases without any previous history of convulsions.

Irregularity of the pupils, slow pulse, and hemiplegia or monoplegia were valuable, if occurring along with other symptoms.

In contrast to the last author, Courtney in the discussion announced himself as being as unenthusiastic over surgical intervention in head injuries as anyone could be. Except in such cases as depressed fractures, certain wounds, and uncomplicated superficial clots, he thought traumatic cases were better left to Nature.

He had long ceased to regard the condition of the pupils and of the reflexes as of any special importance. As regards temperature, it was usually subnormal at first from shock. In cases of hæmorrhage alone, it remained about normal; in cases of laceration, there was a steady upward rise almost from the beginning.

DISEASES OF THE EAR, NOSE, AND THROAT

By R. M'KENZIE JOHNSTON, M.D., F.R.C.S.,
Lecturer to the University on the Diseases of Larynx, Ear, and Nose;
and
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THE TREATMENT OF LARYNGEAL TUBERCULOSIS

THIS subject was discussed at the last meeting of the Laryngological Section of the British Medical Association, and since then several papers have appeared on the subject.

The opinion is generally held that primary laryngeal tuberculosis is exceedingly rare, and that in practically every case pulmonary tuberculosis is already present.

Jobson Horne, as reported in the *Journal of Laryngology* for December 1905, states that 97 per cent. of cases of phthisis pulmonalis have laryngeal symptoms at one time or another during the course of the disease. He points out that the laryngoscope may be of great use in the diagnosis of pulmonary consumption.

From information gained in the post-mortem room, his opinion is that, when ulceration is found in the larynx, there are cavities in the lungs, and that when the disease in the lungs has been arrested the larynx heals; that the larynx is not affected in pure miliary tuberculosis, and that the larynx is infected by the sputum from the lungs.

Dr Horne points out that the arytenoid region, the interarytenoid space, the ventricular bands, the lip and cushion of the epiglottis are, in the order stated, rich in glandular structure; the vocal cords consist of three parts; the anterior and posterior thirds are covered by columnar epithelium and contain glandular structure, whilst the middle third—the part essential for voice production—is covered by squamous celled epithelium, and is devoid of glandular structures. This part is most resistant.

Dr Horne holds that the pathology of laryngeal tuberculosis supports those observers who contend that tubercular sputum is most dangerous in its moist state. He maintains that infection passes down the ducts of the glands, and that these ducts become blocked by tubercular tissue: microscopic sections support this view.

As regards treatment, he states that pachydermia laryngis tuberculosa constitutes the natural process of arrest, and that this hyperplasia and metaplasia of the epithelium and fibrosis of the submucosa cannot be assisted by surgical interference, although œdema may be reduced by linear incisions. He is strongly against the use of curettes and forceps. It is therefore essential to treat the patient and not only the larynx; as the former improves, so also will the latter.

Inhalations and intratracheal injections are recommended. Sanatorium treatment is, however, evidently regarded as essential.

Advanced cases of laryngeal tuberculosis may require reduction or removal of an enlarged epiglottis, or linear scarification in cases of œdema. An indolent ulcer may be curetted and painted with lactic acid.

S. H. Habershon, Physician to the Brompton Hospital, mentions three views as to the etiology of the disease:—

(1) Louis'—that it is due to the corrosive action of the sputum.

(2) Rheiner's—that it is due to friction of the vocal cords and other parts on account of incessant coughing.

(3) M. Mackenzie and Heinze attribute the disease to some special weakness of the larynx in individual cases, probably due to chronic catarrh.

In 1255 cases examined after death, laryngeal disease was found in 48 per cent.

Habershon appears to agree with Horne as to the usual sites of laryngeal tuberculosis and the reason for the special selection of these parts.

In early cases we may find either (*a*) the anæmic larynx, or (*b*) the catarrhal larynx. Anæmia of the larynx alone, without a general anæmia, should lead us to suspect lung disease, especially of the apices. The characteristic pyriform swellings of the arytenoids is due to tubercular infiltration. As a rule, laryngeal tuberculosis follows an acute laryngitis. The acute stage yields to treatment, but a chronic laryngitis remains.

Both the preceding conditions may go on to the stage of ulceration.

As regards treatment, we must in the premonitory stages improve the general health by open-air treatment, ample food, and tonics.

Laryngeal catarrh should be treated by sedatives and mild astringents. The inhalation of the vapour of Tinct. Benzoini Co. or of Ol. Pini Sylvestris is specially recommended.

Rest of the larynx and freedom from dusty atmosphere are important. If the latter cannot be attained, a respirator should be worn.

Cough must also be treated, and if the catarrh becomes chronic, stronger astringent inhalations and applications must be used.

The early ulceration stage is still hopeful, but absolute rest of the larynx must be insisted on. The patient should not speak at all, or only whisper. If the ulcer be superficial and easily seen, it may be painted with lactic acid, after cocaine has been applied. The strength of the lactic acid solution must be gradually increased.

Iodine inhalations are also useful. In the advanced ulcerative stage, tracheotomy is sometimes called for. Thyrotomy and excision of the larynx are usually fatal.

As a rule we can relieve symptoms by cocaine lozenges or sprays before food: the insufflation of orthoform is, however, by far the best palliative.

Finally Dr Horne lays stress on the early and efficient treatment of the catarrhal stage.

Professor Sonenwald of Münich, in a paper published in the same issue of the Journal, emphasises the importance of being sure that we are dealing with laryngeal tuberculosis, even in cases which are undoubtedly suffering from pulmonary consumption: prolonged and accurate observation of the case is necessary, as cases of syphilis and carcinoma have been mistaken for laryngeal tuberculosis.

Again, observation alone will prove whether the case is hopeful or not, and the extent to which it will stand severe therapeutic measures.

Tracheotomy, by giving rest to the larynx, often does good; absolute rest of the voice is very difficult to obtain, but the results are excellent: this rest cure is specially suitable for cases of acute inflammatory affection of the larynx, combined with copious expectoration.

Professor Sonenwald does not believe in cauterisation or curettage, except in rare cases, on account of the impossibility of removing the whole of the disease: he uses instead a finely pointed, stiff galvano-cautery, which is pushed deeply into the infiltrated area and kept there for five to ten seconds: the effect of this is far-reaching, and it is followed by only slight reaction, which passes off in from eight to fourteen days.

This method cannot be used in lesions situated below the cords, or in cases in which the cartilages are affected.

Cases of laryngeal tuberculosis complicated by syphilis are very difficult to treat: anti-syphilitic remedies are not as a rule well borne, though in some cases potassium iodide causes a rapid improvement in the local disease as well as in the general condition.

If iodide fails, local treatment alone should be employed; but if mercury seems to be unavoidably indicated, it should be given in small doses, and the weight of the patient noted: the dose should only be increased when the weight of the patient also increases.

In opening the discussion on this subject, St Clair Thomson referred to the unreasoning use of lactic acid in cases of tuberculous deposit with unbroken surface epithelium, and also to the useless removal of granulations: he states that he does not believe in these futile attempts to kill or remove the tubercle bacillus, and that he regards vapours, sprays, paints, and inhalations as remedies merely for the relief of symptoms.

In the main he thought they must rely on raising the

patient's powers of resistance, so that the products of tubercular laryngeal disease might be either cast off or surrounded by fibrosis: he admitted, however, that they might interfere sometimes with advantage to hasten these processes.

Thomson claimed to have been one of the first to urge the value of voice rest in this disease, and stated that this was much more easily carried out in a sanatorium than elsewhere. In his opinion extensive or old pulmonary disease, rapid pulse, persistent elevation of temperature, anorexia, loss of weight, pregnancy, syphilis, and bad family history are all of bad omen. The prognosis improves each year that the patient has passed forty. If the lung condition is hopeless, it is quite useless to treat the larynx; but, on the other hand, if the pulmonary condition is improving, whilst the laryngeal disease threatens to become chronic, surgical interference is called for. Infiltration or superficial ulceration of the cords, or of the pre-arytenoid or inter-arytenoid region, he regards as favourable for surgical treatment, also localised chronic infiltration of the epiglottis or aryepiglottic fold.

Invasion of both sides of the larynx, persistent pseudo-œdema, perichondritis, disease of the subglottic region, or extensive and acute disease of the epiglottis associated with other laryngeal lesions are all unfavourable.

Statistics from sanatoria show that cases of laryngeal tuberculosis are rare now that early cases are, as a rule, sent for treatment: formerly phthisis laryngea was common in sanatoria.

Harold Barwell divided all cases into three groups:—

1. Those in which a complete cure might be obtained.
2. Those in which an attempt should be made to heal the laryngeal lesion.
3. Those in which symptoms could merely be relieved.

Barwell is on the whole inclined to favour active surgical interference in the majority of cases, and advises the routine inspection of the larynx in all cases of pulmonary tuberculosis at frequent intervals.

Nathan C. Haring relied on sanatorium treatment, aided by rest of the voice, for the cure of this condition; he favoured the injection of 20 per cent. menthol in olive oil in tracheal ulceration.

Scanes Spicer said that the early promise of the heroic surgical measures advocated by Krause and Heryng had not been fulfilled; he himself laid stress on free nasal respiration, the cessation of mouth breathing, and the systematic development of the patient's respiratory capacity by free chest expansion.

Dundas Grant mentioned the glass tube of Leduc, by means of which patients can themselves inhale powders into the larynx; he also pointed out the difference between tubercular infiltration of the larynx and œdema, and stated that the latter was due to mixed infection, and was often produced by the indiscreet use of lactic acid.

Watson Williams, whilst agreeing as to the value of silence, stated that it sometimes caused the patient to become depressed, and that it was not so essential in cases in which the epiglottis or the margins of the vocal cords were alone diseased, as when the arytenoid region was affected: in cases in which the cough was excessive and due to irritation, he believed in codeine and heroin. He had seen many cases, which had not responded to rest, clear up under lactic acid applications: he used ten, twenty, or thirty per cent. solutions applied with a spray after the use of cocaine.

Adolph Bronner strongly advised the use of a formalin spray (1 to 1000 up to 1 to 10) or a paint (1 to 100 up to 1 to 5): in case of ulceration, after the application of a weak cocaine solution, he advised the use of formalin in glycerine (1 in 50 up 1 in 5).

Replying, Jobson Horne considers that the discussion had elicited a remarkable consensus of opinion against the use of extreme local measures: his opinion was that the larynx was a mirror to the progress of the disease in the lungs, but the disease in the larynx was far deeper and more extensive than it appeared to be in the mirror held in the throat.

Barwell, in winding up the discussion, maintained that routine inspection and active treatment in an early stage resulted in a considerable proportion of cures: this treatment could not, however, be satisfactorily carried out in a large laryngological clinic, for great attention must be paid to the temperature chart, the weight of the patient, and the condition of the lungs.

On the whole the opinion of the Society seems to have been in favour of sanatorium treatment, rest of the voice, and non-interference in all but exceptional cases.

PUBLIC HEALTH

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Bacteriological Examination of Milk.—In addition to the routine inspection and testing for the detection of adulterations of milk, many towns have recently undertaken the bacteriological examination of this staple food. The methods employed

differ in various laboratories, so that it is not always possible to compare fairly the results obtained. With the object of securing more uniform methods, Slack has published (*Journal of Infectious Diseases*, Supplement No. 2, February 1906, p. 214) the procedure adopted at the Boston Board of Health Laboratory. A special form of apparatus has been devised for the collection of samples. It consists of a copper case, with double walls interlaid with half-inch felting, divided into three compartments. The central compartment is for the samples, and the other two hold ice, and there are apertures in the partitions which allow ice-water to circulate freely round the lower ends of the samples, which are placed in test-tubes in the centre compartment. The test-tubes are held in racks made of copper tubing weighted with a strip of lead and padded with rubber. When this outfit is iced and closed a constant temperature of 34° F. is maintained. The milk is thoroughly mixed, and samples are transferred to the clean sterile test-tubes by means of sterile pipettes. The pipettes are carried beneath the sample case in a detachable copper box adapted for sterilising, and divided into two compartments, the upper for clean sterile pipettes, the lower for the pipettes after use. The collected samples are transferred in the case to the laboratory, and the milk is examined by plating and by microscopic scrutiny of the sediment.

The dilution commonly employed in the process of plating is 1 in 10,000, though in exceptional instances of good and bad milk the dilution may be 1 in 100 and 1 in 1,000,000 respectively. The medium used for the plates is 1 per cent. agar. Gelatin is not used on account of the variability of room temperature and the length of time which must elapse before a report can be made. The agar plates are incubated for twenty-four hours at 37° C., in a saturated atmosphere, and the colonies counted at the end of that time. Incubation for forty-eight hours gives a higher average count, but the numbers may be complicated by large colonies spreading over and obscuring smaller ones. The porous Petri-dish covers suggested by Dr Hill are highly commended; their special advantage appears to lie in the prevention of spreading colonies, which are apt to extend over the surface of the medium.

This inconvenient extension of growth appears to be due to the condensation water so common on the glass covers and on the surface of the medium. The dry porous covers are made of earthenware instead of glass, and absorb this condensation water. They are cheaper and more durable than glass, and should be washed as seldom as possible. The process of sterilisation of these covers should be prolonged over

the time necessary to render them sterile in order to dry the covers thoroughly by heat. Slack then describes a special counting apparatus with a reading-glass magnifying about two diameters. A tally record, for adding and recording the counts by a simple pressure of the thumb for each colony seen, completes the outfit.

The further examination of the milk consists in centrifugalising a known quantity and obtaining the sediment. The quantity taken is generally 2 c.c., and the process is conducted for ten minutes at a speed of 2000 to 3000 revolutions a minute. This takes place in a small tube with rubber stoppers at each end. The sediment is smeared on a glass slide with a drop of sterile water, dried by gentle heat and stained with methylene blue. The specimen is examined with a $\frac{1}{12}$ oil immersion lens, and gives a good idea of the number of bacteria present. If a graduated slide be used, an estimate of the bacteria present may be made from the microscopic examination, and this estimate compared with the number revealed by the plating method. With any given sample the methods will probably agree as to whether there are more or less than 500,000 bacteria per c.c., but the microscopic test is not delicate enough as a method of enumeration for very clean milk, or as the sole basis for numerical statement of the organisms present in a dirty milk. The microscopic examination is also useful in detecting pus cells and leucocytes, but as yet there is no agreement as to the number of such cells, seen in the field of the oil immersion lens, which would indubitably indicate pus in the milk. Some observers take this number as ten, while others suggest fifty as the standard when the sediment of 2 c.c. of milk is spread over 4 square centimetres. The direct microscopic examination is not very reliable as to the presence of streptococci in numbers sufficient to condemn the milk. In Boston these three tests must all be positive before a milk is so condemned: (1) Streptococci, diplococci, or cocci on microscopic examination of the sediment; (2) plate from the same sample, showing colonies resembling streptococcal colonies in excess of 100,000 per c.c.; (3) broth culture from these colonies, showing streptococci alone or in great excess over other bacteria present.

A note on the correlation of temperature and bacterial count concludes a useful contribution to the methods of milk examination for municipal purposes.

Analysis of Water.—Guillemard (*Annales de l'Institute Pasteur*, tome xx. p. 155, Feb. 1906) calls attention to the ratio between the ærobic and the anærobic organisms as a criterion of the purity or pollution of water-supplies. After comment on

the neglect of anærobic cultures in many bacteriological examinations of water, and reference to the frequency with which such examinations are restricted to enumeration of colonies growing ærobically on gelatine plates, the author describes a method of anærobic culture applicable to water analysis. For this method he claims the virtues of simplification and rapidity of execution. Briefly, it consists in the use of an agar medium in a sealed pipette full of hydrogen gas. The apparatus required is shown in an illustration to which reference may be made by those desirous of conducting the process. The agar is specially prepared so as to be more transparent than the same medium prepared in the ordinary way. The author objects to the use of white of egg to clarify the agar, and ascribes to this albuminous substance a certain opacity of the medium which renders it sometimes difficult to count the colonies present. The special medium contains 1 per cent. of agar, and is nearly as transparent as jelly in the pipette; it can equally be used for the preparation of Petri plates for ærobic culture. In examining a water both ærobic plates and anærobic pipettes are made with this agar and from the same dilution of water, and the cultures are incubated at 37°-38° C. The colonies are counted at the end of two or three days, and the numbers respectively growing under ærobic and anærobic conditions are then compared. The author submits a table showing the ratio between the ærobic count and the anærobic count in various waters examined in the neighbourhood of Paris. Taking 1000 ærobic colonies per c.c. as the fixed comparative figure, the anærobic colonies numbered from 76 to 1750 per c.c. in waters of various degrees of purity. The ratio of anærobics is highest in waters contaminated by sewage or in surface waters from cultivated land, whilst it is lowest in pure waters. Some interesting results were forthcoming from a study of the variations observed in this ratio. For instance the water of the river Marne showed before filtration 8500 ærobes and 730 anærobes per c.c.—a ratio of 1000 to 86—while after filtration it showed 23 ærobes and 8 anærobes per c.c.—a ratio of 1000 to 347. The filtration has effected a satisfactory purification of the water, but its influence has been exercised most largely upon the ærobic bacterial content. The Seine above Paris showed 6000 ærobic and 1800 anærobic colonies per c.c.—a ratio of 1000 to 300—whilst below Paris it contained 56,000 ærobic and 5600 anærobic colonies—a ratio of 1000 to 100. The numerical increase of organisms is no doubt due to the pollution of the river as it flows through the town, while the change in the ratio may be explained by a disproportionate multiplication of the ærobes in the flowing river. On the other

hand, two analyses of the water of the Vanne showed ærobes 92 and 111, and anærobes 7 and 15 respectively per c.c.—the ratio in the one case being 1000 to 76, and in the other 1000 to 136. Here the numerical count was but slightly increased, but the variation in the ratio suggested some contamination of the water from an external source of pollution. Whilst enumeration of the colonies in a water is a guide to the density of its pollution, the determination of the ratio between the ærobes and the anærobes may give a clue to the nature of the contamination, and suggest the history of the water.

The Smoke Nuisance. — At the recent Conference on Smoke Abatement under the auspices of the Royal Sanitary Institute and the Coal Smoke Abatement Society, attention was directed to the pollution of urban atmospheres by smoke from domestic and from trade fires (*Journal of Royal Sanitary Institute*, Feb., March, and April 1906). The presidential address was delivered by Sir Oliver Lodge, who, after reference to the noxious characters of coal smoke, pointed out that the only way to deal with town fog is to refrain from producing it, and to avoid the imperfect combustion of fuel to which such fogs owe their origin. A remedy for such fogs as river and sea mists may be found in electrification of the air on a large scale, but the method is too expensive for the dissipation of town fog, which is more dense, more readily formed, more permanent, and more acid than other fogs. The solution of the problem of combustion lies in (1) the purification of fuel, (2) proper methods of combustion to the avoidance of dust, and (3) utilisation of heat without waste. The crude coal should be purified before combustion, and its solid and gaseous constituents should be separated from one another. The solid constituents, in the form of coke, would be specially useful in manufacturing processes, and might be used for such purposes in the neighbourhood of a coalfield, whilst the gaseous product, after purification, could be transmitted into towns and used there as fuel. If all heating and cooking were done by gas, the air of our towns would be more pure, and the gas could be supplied in large quantities at a low price. To ensure complete combustion of fuel there must be no cold surfaces to interfere with ignition, and there must be an adequate supply of air. These conditions are difficult to fulfil in the firing of boilers, but much attention has been given to scientific furnace stoking. Fresh fuel is introduced either under or in front of a burning and red-hot mass, so that the products of distillation may be raised to combustion temperature before they escape. Sufficient air is admitted, and it is warmed by waste flue-heat before admission to the furnace. Automatic

stoking apparatus may be used, but intelligent stoking may lead to even better results than automatic feeding of furnaces. The utilisation of the heat without waste also demands nicety of adjustment.

Domestic smoke abatement was the subject of an address by Sir George Livesey, in which it was pointed out that the smoke of London was due much more to domestic fires than to factory emissions. The former source of smoke is being greatly diminished in London by the introduction of gas cooking-stoves, which are in use by 70 per cent. of the consumers in the three metropolitan gas companies. This great increase in the use of gas for cooking purposes is attributed to the introduction of the penny-in-the-slot meter, and to the system of hiring out stoves by the gas companies. Smoke abatement is an incidental advantage in this spread of gas cooking, but the main object of the companies has been to sell gas, and of the consumer to obtain convenient and clean fuel. While the problem as regards cooking is thus solving itself, the use of the domestic fire for heating purposes continues to contribute to the smoke nuisance. It is impossible to burn coal in ordinary grates without smoke, and British people will not readily dispense with the cheerful open fire and substitute stoves in which smokeless solid fuel like coke and anthracite can be burned. While deprecating the inevitable smoke produced by an open fire we can, at all events, remember to its credit its value as a ventilator of our dwellings by causing draught up the chimney. The question arises, Is it necessary to use coal as domestic fuel? This question was answered by Sir Charles Cookson in the negative. He submitted to the Conference an account of his experience in the use of coke (charred coal) as domestic fuel in ordinary grates. Having tried anthracite first, he finally used coke on account of its greater cheapness and higher power of radiating heat. The initial difficulty with these smokeless fuels is in lighting them, but this was surmounted by the introduction of a gas supply to the grate to set the coke alight. There are other advantages besides the abatement of smoke, viz., economy in fuel and firewood, radiant heat from glowing coke, cleanliness in the household, no chimney-sweeping required, and adaptability to ordinary grates. Such a charred coal fire requires a large supply of air, but Sir Charles Cookson states that in his experience such fires do not give out unhealthy fumes.

The substitution of gas for solid fuel in the heating of houses is not making great progress on account of the expense involved. It is more costly than coal when the fire is required throughout the day. Gas is more convenient and cleanly, and it is possible to obtain a gas fire which is efficient and which

provides for the assistance of ventilation. A cheap gaseous fuel is the desideratum, and this ought to be quite possible now that the gas supply to a house need not be of a very high illuminating power. By the use of the Welsbach incandescent burner a good light can be obtained from a gas of low candle-power which could also be used for heating purposes. The production of such a cheap gas is delayed by the regulations as to the candle-power of gas supplies, and by imperfections in the processes adopted. These obstacles are in process of removal, and a cheap gaseous fuel may be attained before very long.

New Books and New Editions

A Text-Book on the Practice of Gynecology for Practitioners and Students. By WILLIAM EASTERLY ASHTON, M.D., LL.D., Professor of Gynecology in the Medico-Chirurgical College, and Gynecologist to the Medico-Chirurgical Hospital, Philadelphia, etc. Pp. 1079, with ten hundred and forty-six new line drawings illustrating the text, by JOHN V. ALTENEDER. Philadelphia and London: W. B. Saunders & Company. 1905.

PROFESSOR ASHTON'S work is one of those bulky tomes dealing with Gynecology which we are beginning to expect almost as a matter of course from the other side of the Atlantic. They represent a prodigious literary activity among the American exponents of the theory and practice of the subject, which, ever since the early days of Ephraim M'Dowell and the later times of Marion Sims, has flourished and progressed in a very special manner in the United States. Gynecology has taken firm root in America, and the contributions which America has made, more particularly to the operative side of the specialty, have been many and various and often most valuable.

The present work is, we think, the most profusely illustrated that we have yet had an opportunity of reviewing. Excluding the Index, the volume contains 1041 pages of letterpress, and there are 1046 illustrations, or roughly one picture on each page. Where there are so many, there are of course some figures which are unnecessary, but it must be admitted that most of them demonstrate some useful fact. Special attention ought to be directed to the numerous pictures of groups of instruments: nearly every operation has its accompanying illustration showing all the instruments likely to be needed in the doing of it laid out and obvious to the eye. We should think this feature of

Professor Ashton's book one certain to gain the compliment of imitation by other treatise-writers.

In his preface, Professor Ashton says that he believes that there is "a place for a Practice of Gynecology which aims to take nothing for granted in describing gynecologic diseases, and which not only states what should be done in every case, but also gives directions and illustrations so explicit that they may be intelligently and easily followed." It is for this reason, we suppose, that minute details are given of the microscopic and bacteriological methods, of the composition and characters of the blood, of hydrotherapy, of the preparation of water for drinking, of diet (including such things as milk punch, cracker gruel, barley pudding, and the like), of surgical asepsis and antisepsis, and of appendicitis. These additions considerably swell the bulk of a book already on the large side; indeed, the author himself apologises for its size, saying, "the book is unusually large for a work on Gynecology, but it was impossible to lessen the number of pages and at the same time give the necessary technic, details, and space for the large number of illustrations." Here we differ from the author, for we think none of the subjects enumerated above required to be included; certainly we do not believe that anyone intending to do the operation for appendicitis would go to any other than a text-book of Surgery for it, or would be disappointed at not finding it in a treatise on Gynecology.

Large as the work is, however, there are details in which it is defective. Of course one does not expect to find full bibliographies in text-books; but an occasional reference to a well-known gynecologist of the past or to his special contribution to the subject under discussion is, we think, expected of a modern writer and operator. Indeed it is generally admitted that such a subject as ovariotomy is made easier reading, if nothing more, by some allusion to the great advances which were made when this operation came into use and opened up the way for all abdominal surgery; and the advances without those who made them have lost their human interest. Again, the almost complete absence of references to the pathology of the female generative organs is to be deprecated. No doubt there are text-books of Gynecology that err on the side of over-elaborating pathological details; but assuredly this work goes to the other extreme and almost starves the reader.

These, however, are only faults that serve to throw into stronger relief the excellent features of the work. The thoroughness of the descriptions of operative details and of the successive steps of operations, the inclusion of such modern methods as the use of X-rays in Gynecology, and the general fairness shown by

the author in his statement of disputed points combine to make the book a valuable one, no less to the gynecologist of some experience than to the young specialist. Of course, the author has his own ideas on some points and expresses them freely. For instance, he does not shave the mons veneris before operating, for the reason that he thinks that the skin retracts around the ends of the hairs, forming small pits which are more difficult to sterilise than the short hairs themselves. Oxygen gas is administered as the patient comes out of the anæsthesia after operation, and vinegar fumes then take its place. Both chloroform and ether are recommended as anæsthetics, and nitrous oxide is advised for short examinations. We note that instead of italicising important sentences in the usual way, the author has adopted the German fashion of spacing the letters and words widely apart; this gives a somewhat unfamiliar appearance to the pages, but it has its advantages.

Gynæcological Diagnosis: A Manual for Students and Practitioners. By ARTHUR F. GILES, M.D., B.Sc. Lond.; F.R.C.S. Edin.; Gynæcologist to the Tottenham Hospital. Demy 8vo, pp. x. + 212, 35 illustrations. London: Baillière, Tindall & Cox. 1906. Price 7s. 6d. net.

DR GILES is favourably known to the profession by his work on *Menstruation and its Disorders*, and as the collaborator with Mr Bland Sutton in their text-book on the *Diseases of Women*. The present volume is an attempt to build up a knowledge of Gynæcology from symptoms. The most striking subjective phenomenon is elicited, and then the case is studied from this standpoint, and finally the diagnosis is completed by the physical examination. Of course this is the plan that most gynæcologists adopt, the difference being that many do not perhaps emphasise the value of the purely symptomatological indications so much as does the writer. There is a good chapter on the Significance of Symptoms, and another on the Interpretation of Physical Signs; then, in their order, the leading symptoms (amenorrhœa, pain, hæmorrhage, discharge, pruritus, dyspareunia, sterility, repeated abortions, bearing down, bowel and bladder disturbance, swelling of the vulva, and swelling of the abdomen) are fully discussed; useful tables of comparison and diagnosis are given. In most of the details the work follows conventional methods and lines. We notice, however, that the author prefers what he calls the "gynæcological position" to the lateral position for ordinary examinations; by this he means the patient lying on her back, with the buttocks brought to the end of the

couch, the feet supported on some kind of foot-rests, and the knees separated. The medical attendant stands opposite the perineum. We are not quite certain that we agree with Dr Giles when he says that it is the fact of an examination and not its method that is repugnant to a patient. In speaking of the vaginal examination, the author refers always to "the finger"; but for all such examinations two fingers give far more than twice as much information, and should accordingly be used. There are some helpful illustrations of a diagrammatic kind.

Atmokausis und Zestokausis: Die Behandlung mit hochgespanntem Wasserdampf in der Gynækologie. By Dr LUDWIG PINCUS. Second edition. Pp. 372, 38 illustrations. Wiesbaden: J. F. Bergmann. 1906.

To most medical men and to some gynecologists it will be a surprise to learn that there is a work of nearly 400 pages dealing with the operations of atmokausis and zestokausis alone. In this country simple curettage is so commonly employed and with such satisfactory results that there seems little room for the uterine vaporisation methods. But, granting the necessity for such a work, no one has a better right or greater ability to write it than Dr Pincus, who has indeed been called "the father of atmokausis." In his book, which has reached a second edition, Dr Pincus devotes 125 pages to the history of the operation, and this is a liberal allowance when we remember that Sneguireff first employed vaporisation in 1886. The instruments and technique, experimental observations, and the anatomy of vaporisation are all in turn described; and then the clinical methods, indications, contra-indications, dangers, and the like are dealt with in great detail. The work is brought to a conclusion with a long list of bibliographical references (401 in number). Some of the indications may be named, such as preclimacteric bleeding, hæmophilia, the bleeding in uterine fibroids, and in inoperable cases of carcinoma of the body of the uterus, menorrhagia and metrorrhagia (due to endometritis and subinvolution), for the sterilisation of a patient, for sapræmia, tubercular and gonorrhœal endometritis, and sepsis. It is evident, therefore, that the operation is indicated in the same classes of cases as is curettage. In atmokausis the mucous membrane of the uterus is cauterised by steam passed to it by means of a two-way catheter; in zestokausis the catheter is closed, so that the steam does not come into direct contact with the mucosa. The steam is generated in a Pincus' boiler. On the whole, the

evidence that vaporisation is better than curettage does not seem sufficiently conclusive to lead others than specialists to prefer the former; but to all who may desire to know the latest and the best about the operation, Pincus' book will be of great value.

Essentials of Gynæcology. By EDWIN B. CRAGIN, M.D. Pp. 212. London: Henry Kimpton. 1906. Price 3s. 6d. net.

THE author expresses the hope that this book may be of use "as a means of review and as a summary of the results of more extensive reading." The book seems to us, however, only to have a place as a "cram-book." That it now appears as a sixth edition, far from proving, as the author suggests, "that it occupies a useful niche in the book world," only shows that there must be some serious defect in the teaching of gynæcology at the schools where there is a demand for such a book. It seems the irony of fate that a book of this sort should be written by a Professor of, and revised by an Instructor in, Gynæcology!

The book is in the form of question and answer. The answers are as a rule fairly full. To elucidate the anatomical and operative elements in the text, the author has introduced over fifty illustrations, chiefly copied from standard text-books.

Abdominal Pain. Its Causes and Clinical Significance. By A. ERNEST MAYLARD, M.B., B.S. (Lond.). London: J. & A. Churchill. 1905.

MR MAYLARD has evidently expended much care on the compilation of this volume. But the marshalling, in one volume, of facts and statements bearing on only one symptom of abdominal disease is apt to render the point of view too narrow. There are many valuable facts, but nothing strikingly new in the volume, and one or two of the statements, hard-dying relics of the teaching of old writers, are not supported by present-day experience. The perusal of the book will impress the reader with the importance of the fact that abdominal pain, *per se*, cannot be regarded as a touchstone in the diagnosis of abdominal disease. It seems rather out of place that so much space (one-third) should be devoted to a description of technique, treatment, and results, in a book with the above title.

Abdominal Operations. By B. G. MOYNIHAN, M.S. Lond., F.R.C.S. Leeds. Fully illustrated. Philadelphia and London: W. B. Saunders & Company. 1905.

WE may unhesitatingly state that, in our opinion, this work is one of the best practical books on abdominal surgery available. It deals only with operations on those organs which are strictly in the abdominal cavity and common to both sexes. Herniotomy and the treatment of renal and pelvic conditions are consequently not included.

It is careful attention to minutiæ in the description of operative procedures that makes a book like this of real practical use. That Mr Moynihan has recognised this is evident, for in his introductory remarks he states: "success in abdominal surgery, as in all the affairs of life, depends very largely upon the observance of details." Further, his large surgical experience and convincing literary style are two assets which go far to make the work an interesting and valuable one.

The book, which is a large and handsome one containing upwards of 600 pages, is divided into five sections. The first of these deals with general considerations. It includes chapters on the preparation and after-treatment of the patient, the conduct of operations, the selection of abdominal incisions, treatment of different varieties of peritonitis, subphrenic abscess, etc. Mr Moynihan strongly advocates operating in gloves under all circumstances, although he admits it is possible to obtain practically perfect sterilisation of the hands, as Prof. Kocher's statistics show. A fine surgical touch is soon attained. We note also that in general peritonitis he places more faith in multiple drainage than in washing out the abdominal cavity. Errors in aseptic technique are also fully considered.

The second and third sections deal at length with the operative treatment of gastric and intestinal conditions. Here the illustrations (of which there are 235) are calculated to give an excellent idea of the anatomy of the parts as well as the technique of the operation. Numerous modifications of individual operations are fully and carefully discussed, and tables of results obtained by different methods have been added. The remaining sections deal with the surgery of the liver, pancreas, and spleen.

As a practical manual on modern methods of abdominal surgery this book is sure to enjoy a deserved popularity.

Chavasse's Advice to a Mother on the Management of her Children, Etc. Sixteenth edition. Revised and largely re-written by THOMAS D. LISTER, M.D. London: J. & A. Churchill. 1906. Price 2s. 6d.

IN this little book all sorts of questions which a young mother could ask about her child are answered at length; and the answers are interspersed freely with quotations from history, poetry, and general literature, and with a good deal of kindly moralising. The fact that more than 300,000 copies of former editions have been sold, shows beyond a doubt that the book has been very successful in meeting the want which it was intended to supply. The present edition has been thoroughly revised by Dr T. D. Lister, and some of its more important parts re-written. It contains a great deal of sound advice, and may be confidently recommended to intelligent mothers.

Baby: Useful Hints for Busy Mothers. By EDITH L. MAYNARD, late Sanitary Inspector, Sheffield, with an introductory note by JOHN ROBERTSON, M.D., B.Sc., Medical Officer of Health for Birmingham. Bristol: John Wright & Co. 1906. Price One Penny.

THIS is an admirable little pamphlet written by a former Sanitary Inspector, who has intimate personal knowledge of the difficulties which poor mothers have in bringing up their babies. It is meant for the really poor—those who have to use American cloth instead of mackintosh, and to make their baby's cradle for themselves out of an orange box. Miss Maynard's advice is very clearly put, and is full of little practical details such as are too often taken for granted in such writings.

The Diseases of Infancy and Childhood. By HENRY KOPLIK, M.D. Second Edition, thoroughly revised and enlarged. Pp. 885, with 184 engravings and 33 plates. London: Kimpton. 1906. Price 25s. net.

PROFESSOR KOPLIK'S work on diseases of children is already well known to the profession, and that it has been favourably received is shown by the fact that a second edition has been called for in a comparatively short time. The present edition has been carefully revised, and is a distinct improvement on the first. The section dealing with infant feeding, notably,

has been rearranged and practically rewritten, and in its present form is likely to be more useful to the practitioner. The methods of modifying milk at home are clearly described, but we are afraid that in this country we cannot count on ordinary milk containing 4 per cent. of fat. To the section dealing with infectious diseases numerous additions have been made. Here, as in some other parts of the book, the differential diagnosis might have been discussed more fully with advantage. The so-called "fourth disease" does not seem to have crossed the Atlantic. The descriptions of the various forms of anæmia, which were decidedly inadequate in the first edition, are now more satisfactory. New illustrations have been freely added. Professor Koplik has been fortunate in his artist, Mr Dupuy, who deserves praise for the excellence of his work.

Nursing in the Acute Infectious Fevers. By GEORGE P. PAUL, M.D. Pp. 200. Philadelphia and London: W. B. Saunders Company. 1906.

THE conciseness and the great clearness of this handbook should recommend it to all nurses desirous of acquiring a useful knowledge of infectious diseases and the methods of nursing which they require. Dr Paul divides his subject into three parts. In the first he gives a general account of fever, of its treatment, and of the symptoms which may complicate it. In the second he considers the different infectious diseases seriatim, while he devotes the third to a brief and simple account of antitoxins, bacteria, and the like. There is no chapter in the book which a nurse of average intelligence cannot easily understand, and in attaining this degree of lucidity, we think that Dr Paul has been much more successful than the writers of many other nursing handbooks. Useful hints on the feeding of infants are given, and the methods of reducing temperature by refrigeration are carefully detailed. The book abounds in excellent advice on the treatment of those conditions which come particularly into the province of the nurse. A number of admirable temperature charts illustrate the course of the fever in the different diseases described, which, we may here note, include lobar pneumonia, acute articular rheumatism, and malarial fever. There is perhaps too great a tendency to repetition, the treatment of such conditions as tympanites, nephritis and so on, being given both in the first and second parts of the handbook, and in practically the same words. But this may be regarded as an advantage by a busy nurse who is desirous of merely referring to the chapter on the special

disease which interests her at the time. Short notes on the symptoms caused by overdoses of certain drugs, and on the antidotes of the most common poisons, are given at the end of the work, and these should be found of great value. We may conclude by saying that we can most conscientiously recommend Dr Paul's book to all nurses.

Appendicitis, its Pathology and Surgery. By CHARLES BARRETT LOCKWOOD, F.R.C.S., Surgeon to St Bartholomew Hospital, etc. Second edition. London: Macmillan & Co., Limited; New York: The Macmillan Company. 1906.

THE first edition of this work on appendicitis appeared in 1900, and in this, the second edition, the original construction of the book remains the same: it is, however, larger by some 50 pages and includes 10 new illustrations. As its title suggests, it is largely a pathological treatise on some 200 cases of appendicitis the author has operated on which exhibit features characteristic and otherwise of the different forms of the disease. Each case is shortly described and utilised to illustrate different points in the text, while the diagrams and microphotographs indicate the microscopic changes that occur in the appendix. There is a good deal to be said in favour of this method of emphasizing important points, but where so many cases are alluded to the reading becomes rather tedious and the object is apt to be defeated. The author denounces the everyday terms applied to appendicitis, *e.g.* appendicular colic, catarrhal suppurative and gangrenous appendicitis, and advocates a classification according to the pathological changes present in the appendix, *e.g.* appendicitis with ulceration of the mucosa, with bacterial invasion, etc. Though scientific this appears to us a rather unwieldy method to adopt and one more fitted for the post-mortem room than for clinical purposes.

With regard to the diagnosis of acute appendicitis, the author apparently does not place much confidence in the examination of the blood or the presence of the glycogen reaction. The latter valuable diagnostic aid is not alluded to.

Among the 22 chapters which the book contains two of the most valuable are those on the anatomy and histology of the appendix. The later chapters deal with the symptoms, diagnosis, and treatment.

The work is brimful of ideas representing an intimate knowledge of the disease, and is well calculated to stimulate and arouse the keenest interest in what is undoubtedly one of the most fascinating diseases in medicine and surgery.

The Treatment of Gonorrhœa in the Male. By CHARLES LEEDHAM-GREEN, M.B., F.R.C.S. Pp. 148. London: Baillière, Tindall & Cox. 1906. Price 5s. net.

GONORRHŒA is a disease about which much has been written, not always to the advantage of the student. Further, the formidable number of drugs that have been, and are still, advocated for its treatment, are eloquent testimony to the unsatisfactory position of our knowledge on the subject. It is, however, with some hopefulness that, on taking up the latest English monograph dealing with this complaint, we find the name of so competent an investigator as Mr Leedham-Green upon the title-page; nor are we disappointed.

The whole subject is dealt with shortly but most satisfactorily, and is thoroughly up to date. The author in his preface states that his aim has been to give a concise yet detailed account of the modern views on the pathology and treatment of gonorrhœa, for the benefit of those "to whom foreign literature and our own scattered papers are difficult of access." In this he may be said to have succeeded. Further, Mr Green has not a few helpful observations to make on his own account. In addition to the treatment of gonorrhœa, there are chapters on the anatomy of the urethra and bladder, on the bacteriological diagnosis of gonorrhœa, and on its complications.

There is little doubt that, as a general rule, gonorrhœa is still treated in rather too routine a manner. The publication, therefore, of such a book as this serves a useful purpose in combating this tendency. It is, of course, not desirable, nor is it intended, that indiscriminate use should be made of the urethroscopes, urethral dilators, and other modern instrumental aids to diagnosis and treatment described in this and similar works. It is, however, most necessary that more precision should exist in the treatment of gonorrhœa. The practitioner should, at any rate, know whether he is dealing with a case of anterior or posterior urethritis, and whether the trouble is superficial or deeply situated. The sections upon such questions are well and carefully done, and are, perhaps, the best in the book. The necessity for ascertaining whether gonococci are really absent after apparent cures, more especially in relation to marriage, is given due prominence, and the methods by which this important point may be best investigated are capably dealt with. We think, however, that in a book where references to modern works bearing on the subjects discussed are numerous, Prince Morrow's admirable book might here have been usefully mentioned.

The illustrations, which are chiefly of instruments, should prove helpful. The figures or letters, however, in the letterpress

of some of them, do not correspond with those in the diagrams themselves—for example, in fig. 1 and in figs. 30, 31, 32, 33. This is, of course, a small matter, but it gives the reader an impression, probably erroneous, that the work has been hurried at the last. We can, nevertheless, heartily recommend the book.

Surface Anatomy. By RICHARD J. A. BERRY, M.D., F.R.C.S.E., F.R.S.E., Professor of Anatomy in the University of Melbourne; formerly Lecturer on Anatomy in the School of Medicine of the Royal Colleges, Edinburgh, etc. With 46 illustrations. Edinburgh and London: William Green & Sons. 1906. Price 7s. 6d.

Landmarks and Surface Markings of the Human Body. By LOUIS BATHE RAWLINGS, M.B., B.C. (Cantab.), F.R.C.S.Eng., Assistant Surgeon, Senior Demonstrator of Anatomy and Demonstrator of Practical Surgery at St Bartholomew's Hospital; late Assistant Surgeon to the German Hospital, Dalston, etc. With 31 illustrations. Second edition. London: H. K. Lewis, 136 Gower Street. 1905. Price 5s.

THESE two books are written on very similar lines, and can be suitably taken together for review. We have endeavoured in vain to make up our mind which is the better. They are both short and handy volumes, which deal with surface anatomy and surface landmarks in a manner well suited to the student's needs.

Dr Berry's book is considerably the larger and fuller. Beginning with the head and neck, all the other parts of the body are dealt with *seriatim*. In the former section four methods of cranio-cerebral topography are given, with suitable illustrations for each, while the anatomy of the ear and throat receive full attention. We are very glad to see the author adopts Addison's method of subdividing the abdominal cavity, as there is no doubt it is the simplest and best. The diagrams and illustrations are, as a rule, good. They possess the great advantage of being bold and clear in outline. There are two, however, in which anatomical inaccuracies catch the eye. In fig. 35 the left crus of the diaphragm is represented as too long, and is fully two vertebræ too low. In fig. 42 the common flexor sheath of the palm is drawn too square; the distal line should slope more obliquely across the palm.

With regard to the text, it is uniformly clear and precise, and is devoid of all unnecessary matter.

If we might be allowed to pass a criticism, we think that the subject is treated rather too much from the pure anatomist's

point of view; and that if a little more surgical anatomy were incorporated, the book would have further interest, and would cover a wider field of application, without assuming alarming proportions. As it stands, however, Dr Berry's work is undoubtedly of great value, and should prove a faithful friend to the student in his studies.

Mr Rawlings' book, though less pretentious, can also be highly recommended. Its first edition has proved its popularity, and the alterations and additions in this, the second edition, are all on the right side. The illustrations are admirably reproduced. They are clear and accurate, and speak for themselves in a way which renders fuller description in the text unnecessary. The blank side of the diagrams afford a good opportunity for personal notes by the reader.

These two books are quite the best of their kind we know of.

Clinical Applied Anatomy, or the Anatomy of Medicine and Surgery. By CHARLES R. BOX, M.D., B.S., B.Sc. Lond., M.R.C.P. Lond., F.R.C.S. Eng., Physician to Out-Patients, St Thomas' Hospital, etc.; and W. M'ADAM ECCLES, M.S., F.R.C.S. Eng., Assistant Surgeon, St Bartholomew's Hospital, etc. Illustrated by 45 plates, of which 12 are coloured, and 6 figures in the text. London: J. & A. Churchill, 7 Great Marlborough Street. 1906.

THIS book is written on different lines from those followed in most other works on applied anatomy, in that it deals only with the clinical side of the subject. The clinical signs and symptoms with which the practitioner comes in daily contact are considered in respect to their anatomical bearing. It is therefore to the practitioner rather than the specialist that the work will appeal. There is no doubt the idea is a good one, and the authors are to be congratulated on the manner in which they have executed the work. In dealing with the whole of medicine and surgery the ground to be covered is very extensive, and consequently each condition has had to be considered as shortly as possible. We are inclined to think that it would not have been detrimental to the book had the authors omitted some of the more limited departments of the specialist, *e.g.* gynæcology, as they are so condensed as to be of little practical value, and moreover increase the scrappiness of the text. The paragraph dealing with removal of an enlarged prostate needs revision.

On the whole, however, the book serves a very useful purpose and can be recommended alike to student and practitioner.

Transactions of the Medico-Legal Society for the Year 1904-5. Edited by R. HENSLOWE WELLINGTON, Barrister-at-Law, Deputy-Coroner for the city of Westminster; and STANLEY B. ATKINSON, M.A., M.B., Barrister-at-Law. Vol. II. Pp. 117. London: Baillière, Tindall & Cox. Price 5s.

THE Secretaries state in their report that the affairs of the Society are in a very satisfactory condition, and certainly the contributions given at the five meetings are all of a high order of merit. Dr Claye Shaw describes an obscure form of alcoholism involving irresponsibility. The symptoms come on some time after alcohol has been given up, and are often of a suicidal nature. Dr Stanley Atkinson treats of the Definitions of Accident, Accidental, Accidentally. In the discussion on the Proposed Sterilisation of certain Degenerates, most of the speakers were opposed to the method advocated so ably by Dr Robert R. Rentoul. Dr A. Douglas Cowburn pleads for an amendment of the law relating to the responsibility of the criminal insane. Professional Secrecy and Privileged Communications are treated of by Dr A. G. Bateman. In the discussion Sir Thomas Stevenson stated that he thought the present law was a good one, and that it was well to be called upon to tell what one knew. Indeed he would compel the priest and the lawyer also to tell all in the witness-box. At present the law was anomalous; he would make it uniform in the sense indicated. Professor Glaister said that the duty of a medical practitioner regarding the disclosure of secrets was not quite clear in the trial of *civil* causes, but in criminal courts a medical witness was bound to disclose any professional secret if ordered to do so by the Court.

Sir Joseph Walton, in some notes on the Law of Evidence, advises the witness, whether common or expert, not to trouble his mind about the technical law of evidence, but very carefully to attend to every question put to him, not in a spirit of suspicion, but in order to clearly understand it, and to answer it plainly to the best of his ability.

Dr Westcott has a most instructive paper on Suicide. We heartily congratulate the young society on its evident virility.

Student's Manual of Medical Jurisprudence and Public Health. By G. HAXTON GIFFEN, L.R.C.P. & S.E., D.P.H. (Camb.). Second edition, revised and enlarged. Pp. 364. Edinburgh: William Bryce. Price 5s. net.

THAT Miss Giffen's Manual has proved of value to the student is shown by a second edition having been called for. The work is divided into three almost equal parts, Medical Jurisprudence, Toxicology, and Public Health, and aims at supplying all that the student requires for examination purposes. The illustrations do not add to the value of an otherwise useful little volume.

Clinical Bacteriology and Hæmatology for Practitioners. By W. D'ESTE EMERY, M.D., B.Sc., Clinical Pathologist to King's College Hospital and Pathologist to the Children's Hospital, Paddington Green, etc. Pp. 240, with 10 plates, 4 coloured, and 47 illustrations. London: H. K. Lewis. 1906.

THIS work is the second edition of "A Handbook of Bacteriological Diagnosis for Practitioners" by the same author. Being primarily intended for practitioners who are without training in pathology, it fulfils its purpose admirably. The additions to the bacteriological section deal mainly with the examination of material from such special parts of the body as the mouth, conjunctivæ, etc. New sections have been added on clinical hæmatology, cytodiagnosis, and the estimation of the opsonic index.

The conditions are indicated under which a certain examination may be helpful, the methods to be employed are very carefully, fully, and accurately described, and the interpretations which may be drawn from the results of examination are well set forth. The plates, both coloured and otherwise, are admirably reproduced, and there is a wealth of good illustrations throughout the text.

There is only one feature of the work open to criticism, namely, that in the sections dealing with the diagnosis of bacteria, attention is not sufficiently directed to their cultural characters. But had more stress been laid thereon, the work would probably not have been so useful to the practitioner.

The Science and Art of Prescribing. By E. H. COLBECK, B.A., M.D. (Cantab.), F.R.C.P. (Lond.), D.P.H. (Cantab.), &c., and ARNOLD CHAPLIN, B.A., M.D. (Cantab.), F.R.C.P. (Lond.), &c., &c. Second edition, revised and enlarged. Pp. 198. London: Henry Kimpton. 1906. Price 3s. 6d. net.

WE had occasion to notice the *first edition* in April 1903, and much of what is there stated applies equally to the *second* edition. The object the authors have in view is a noble one, namely, to provide "a short and reliable guide to the art of prescribing." The first part of the book consists of three chapters dealing with the "Methods of Prescribing." These chapters contain much valuable information, and may be read with profit by students and others; but the second part, consisting of eight chapters on the "Application of the Methods of Prescribing," cannot be called a "Reliable Guide to the Art of Prescribing."

Although it contains over 500 formulæ or recommended prescriptions, yet you will never teach a student or practitioner to write prescriptions accurately by writing formulæ for him. Several of these prescriptions have very little merit to recommend them. We are glad to see that in this *second* edition most of the mistakes which we pointed out in the *first* edition have been corrected. The book is not altogether faultless, for at page 65 we find Thymol prescribed in "minims"!

Transactions of the College of Physicians of Philadelphia. Third series. Volume xxvi. Philadelphia: Printed for the College. 1904.

THIS volume of Transactions contains the papers read before the College from January 1904 to December 1904 inclusive, and also the discussions which followed their reading. The various papers are by well-known men, and are of much interest. The first pages are devoted to the enumeration of the officials and members of the College, and then follows the President's (Dr Horatio C. Wood) valedictory address, which has the merit of shortness, but in addition shows the growth of the College, perhaps the oldest in the United States of America, by stating that it has outgrown its present buildings, and for the proper accommodation of its fellows and books requires a much larger building, the site for which has already been acquired. It is sufficient to enumerate some of the papers to show the virility of the College: Aphasia and the Cerebral Zone of Speech, by C. K. Mills, M.D.; Surgery of the Prostate Gland, by J. B.

Deaver; The Treatment of Penetrating Wounds of the Heart, by John H. Gibson; On Hypernephroma, by W. W. Keen, G. E. Pfahler, and A. G. Ellis; Medical and Surgical Considerations of Pyopericarditis, with report of cases, by J. A. Scott and R. G. Le Conte. As long as the Transactions of the College of Physicians of Philadelphia maintain the standard of this volume, the high position which it occupies is assured.

Jubilee Report of Baldovan Asylum for the Treatment, Education, and Training of Imbecile Children. Pp. 40. Dundee. 1906.

BALDOVAN ASYLUM was the first institution of its kind started in Scotland, and owed its origin, in 1852, "to the public spiritedness, the practical philanthropy and foresight of Sir John Ogilvy, Bart. of Inverquharity, and of Lady Jane Ogilvy, his wife." It was formerly opened in 1855, and Mr D. M. Greig, C.M., F.R.C.S.Ed., has written an interesting account of its first fifty years' work. After the publication of their first Annual Report the Directors relinquished their original claim to *cure* their imbecile patients, and contented themselves with the "training, education, and treatment" of the children. The number of cases treated has steadily increased. During the first three years there were 12; in 1865, 28; in 1875, 46; in 1885, 48; and in 1895, 78. During the last ten years the growth of the Institution has been more rapid, and in 1905 there were no fewer than 150 inmates.

During the last two years handsome new buildings have been erected at a cost of £22,501, 15s. 2d. on an admirably suitable site; and the work of the Institution's second half-century seems to be beginning under most favourable auspices.

We have pleasure in congratulating the Directors and the Staff on the splendid work which the Asylum has been doing so quietly during the last fifty years, and Mr Greig also on his excellent Jubilee Report.

The Medical Annual: A Year-Book of Treatment and Practitioner's Index. Twenty-fourth year. Pp. 641. Bristol: John Wright & Co. 1906. Price 7s. 6d.

ALTHOUGH there are nearly 200 pages of advertisements, yet the Year-Book is in itself a bulky volume of 641 pages. We have in preceding years so uniformly praised this Annual that it is hardly necessary to pass any encomium on the present issue. We must congratulate the Editor, however, on his

energy in overcoming the trials which beset him, viz. the destruction by fire of the offices when a large part of the present work was already in type, and then the untimely death by railway accident of Mr Lewis Wright, who was mainly concerned in passing the work through the press.

It is impossible to review a work of this kind; suffice it to state that every practitioner who possesses this work has at hand the most recent methods of diagnosis and treatment. The publishers are preparing a Synoptical Index of the years 1899-1904. This will furnish recent views on the treatment of every disease, and will be of the greatest value to those who possess the former editions of the Medical Annual.

Uric Acid. An Epitome of the Subject. By ALEXANDER HAIG, M.D., F.R.C.P. Second edition. Pp. 162. London: J. & A. Churchill. 1906. Price 2s. 6d.

THIS book is little more than a replica of the first edition. Additions and alterations are not many or important: it contains the same alarming and lengthy list of fearsome diseases, a recantation of the hypothesis that all these diseases are due to uric acid poisoning, and repeated assurance that they can all be wiped off the list by accepting the author's theory and acting on it. But this edition is no more convincing to the critical reader than the former one. To use the phraseology of the author, "the man who has rotted and destroyed his teeth by constant contact with fish and meat" is unable to satisfy himself (perhaps so because of his mental enfeeblement due to his being a flesh-eater) that by reverting to monkey food he would be clear of the risk of those terrible diseases, free from a liability to piles or pneumonia, to epilepsy or phthisis, to mania or local inflammation of the "teeth coverings," to retinitis or atrophy of the skin (with microbes). The volume might provide pabulum for thought to a hypochondriac, but it is doubtful if it could serve any other useful purpose.

An Atlas of Illustrations of Clinical Medicine, Surgery, and Pathology. Compiled for The New Sydenham Society. Fasciculus xvi., price to non-members, 10s. 6d.; and Fasciculus xx., price to non-members, One Guinea.

FASCICULUS XVI. is almost entirely taken up with the subject of coxa vara, and contains a reprint of Keetley's essay on the affection. The illustrations are good, and the seven radiographs, by Robert Jones of Liverpool and David Morgan, are

admirable and most interesting. There are three other plates. A radiograph of an ununited fracture of the surgical neck of the humerus, another of a remarkable displacement of the bones entering into the formation of the elbow-joint in a case of hereditary syphilis, and photographs of a case of multiple alveolar carcinoma of the skin.

Fasciculus xx. contains 26 plates, with descriptive matter, which include 11 photographs of miscellaneous conditions—"Sprengel's Shoulder," "Bazin's Diseases," Congenital Bronchocele and Myxœdema, and various syphilitic lesions. There are 15 excellent radiographs illustrating fractures and dislocations, many from the "Jones-Morgan" collection, which impress one more and more with the value of radiography in the hands of a skilful manipulator. There is a striking radiograph of a knee-joint into which a neurotic girl had been in the habit of introducing needles, with the result that she presented a condition which resembled a tuberculous affection of the joint. Mr Robert Jones, on opening the joint, found 52 needles.

List of Books Received

From J. & A. Churchill.

Pathology: General and Special. Richard T. Hewlett. Price 10s. 6d.

Physical Training in Schools. W. P. Herringham. Price 1s.

Minor Surgery and Bandaging. Bilton Pollard. Price 6s.

Carbohydrate Metabolism. F. W. Pavy. Price 6s.

Uric Acid. A. Haig. Price 2s. 6d.

From Baillière, Tindall & Cox.

Nature and Treatment of Cancer. J. A. Shaw Mackenzie. Price 2s. 6d.

Cause and Prevention of Dental Caries. S. Wallace. Price 2s. 6d.

Gastric Surgery. H. J. Paterson. Price 6s.

Anæsthetics. J. Blumfield. Price 2s. 6d.

New Serum-Therapy. D. M. Paton. Price 6s.

Manual of Medicine. Second Edition. T. K. Monro. Price 5s.

Operative Surgery. W. I. Wheeler. Price 5s.

Diseases of the Eye. C. Hay and C. Worth. Price 10s. 6d.

From David Bryce & Son.

Manual of Medical Jurisprudence. G. H. Giffen. Price 5s.

From Longmans, Green & Co.

Diseases of the Nose. H. L. Lack. Price 25s.

From Macmillan & Co.

Appendicitis. C. R. Lockwood. Price 10s.
System of Gynæcology. Albutt, Playfair & Eden. Price 25s.

From G. Steinheil.

La Question Sexuelle. Auguste Forel. Price 10 frcs.

From Constable & Co.

Physiology. M. Morat. Price 31s. 6d.

From Swan, Sonnenschein & Co.

Fibroid Tumours. J. Shaw. Price 2s. 6d.

From J. Bale, Sons & Danielson, Ltd.

Urethrotomies and Kidney Capsulotomy. R. Harrison. Price 2s. 6d.

From W. B. Saunders.

Diagnostic Methods. Sahli.
A Treatise on Surgery. W. George R. Fowler.
Nursing in the Acute Fevers. George Paul.
Essentials of Genito-Urinary Diseases. S. S. Wilcox.

From H. K. Lewis.

Catarrhal Fevers. R. P. White. Price 4s.
Clinical Bacteriology. W. D. Emery. Price 7s. 6d.
Treatment in Diseases of the Eye. C. H. Burnham. Price 3s.
Public Health Legislation. M. and G. Elliott. Price 5s.

From the Scientific Press.

The Consumptive Working Man. Noël Bardswell. Price 10s. 6d.

From W. Green & Sons.

Encyclopedia of Medicine and Surgery. J. W. Ballantyne.
Local Anesthesia in General Surgery. J. W. Struthers.

From the New Sydenham Society.

Atlas of Clinical Medicine, Surgery, and Pathology. Fasc. XXV.

All Communications—including **BOOKS** *for* **REVIEW** *and* **EXCHANGE JOURNALS**—*are to be addressed to* THE EDITORS, 7 *Manor Place, Edinburgh*, AND NOT TO 43 CASTLE STREET.

THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

ACUTE INFANTILE INTUSSUSCEPTION[1]

By HENRY J. DUNBAR, M.D.,
Formerly House Surgeon, Royal Hospital for Sick Children, Edinburgh

WHILE Resident Surgeon at the Edinburgh Royal Hospital for Sick Children during the winter 1903-1904, I had the good fortune to see no fewer than seven cases of acute intussusception in infants; and on searching the Hospital Records as far back as the beginning of 1898, and also, more recently, up to the present time, I found that in addition there were accounts of over 50 cases of this condition—valuable material which, as far as I am aware, has never been systematically analysed. I took the opportunity also of consulting various text-books and looking up numerous published articles on intussusception, with the result that I found the most divergent opinions expressed as regards the treatment of the disease. For this reason, and because of the great pathological and clinical interest attached to intussusception, I decided to take the material at my disposal as a text for a careful consideration of the whole subject.

The importance of intussusception as a cause of obstruction of the bowels can hardly be over-estimated. If we class together all kinds of obstruction at all ages it is found to form one-third of the cases. In children the proportion is very much higher, over three-quarters of the cases of acute obstruction in early life being due to intussusception.

Intussusception is the turning or prolapse of one portion of the bowel into an immediately adjoining portion. The part invaginated acts as a foreign body to the engulfing portion, and is moved downwards by the active peristalsis of the latter, with

[1] This paper includes practically the whole of an M.D. Thesis which received high commendation, Edinburgh University, 1905.

a consequent enlargement of the tumour. A longitudinal section of such an invagination presents six layers of bowel—three on either side of the lumen. The outer layer forms the sheath, intussuscipiens, or receiving layer. The middle or returning layer, formed by an infolding of the outer, and the inner or entering layer, together form the intussusceptum. The different cylinders of bowel are so arranged that peritoneum is always in contact with peritoneum and mucous membrane with mucous membrane (see Fig. III.). A transverse section would show three concentric rings of bowel. The part at which the sheath is folded on itself to become continuous with the returning layer is termed the neck. The most distal portion of the intussusception, where the returning and entering layers join, is known as the apex. The included mesenteries lie between the entering and returning layers, *i.e.* between the layers of the intussusceptum. In infants a simple invagination invariably occurs in the direction of the normal peristalsis; but double and even triple intussusceptions may be formed, usually by foldings of the sheath, and these secondary invaginations may occasionally be retrograde. It is obvious that these complex varieties will present five and seven layers of bowel respectively instead of three. Intussusception may occur at any part of the intestinal canal, although it is chiefly with the ileum and colon that we have to deal, and I wish first of all to consider briefly the anatomy of the bowel and its mesenteries as far as it affects the subject.

Anatomy.

The small intestine is arranged in coils which are largely superficially situated, and, roughly speaking, the coils of jejunum are in the umbilical, left lumbar, and left iliac regions; those of the ileum in the pelvis, the hypogastrium, the right iliac, and right lumbar regions. During the first few months of life no small intestine is found in the pelvis on account of the relatively large size of the pelvic colon and small dimensions of the pelvis. Treves[1] states that during the first three years of life this arrangement of the coils of small intestine in the form of a curve from left to right, with the convexity downwards, is more constant than in later years. This fact might be of some help in determining the part of gut affected in an enteric intussusception. At birth the small intestine averages about six feet. During the first month it grows two feet, and during the second month two feet, after which the rate of increase is irregular.

[1] The Anatomy of the Intestinal Canal and Peritoneum in Man. Hunterian Lectures, 1885.

The small intestine is attached along its whole length to the posterior abdominal wall by means of an ample mesentery, the root of which is remarkably short, extending from the left side of the body of the second lumbar vertebra obliquely downwards, and to the right across the vertebral column for about six inches to end in the right iliac region. The length of the mesentery from its attachment to the bowel back to the vertebral column varies from eight to nine inches in the adult. It is composed of two layers of peritoneum, between which enter the vascular, lymphatic, and nervous supply of the bowel. The upper or right layer is continuous above with the lower layer of the transverse meso-colon and with the peritoneum investing the ascending colon; the lower or left layer merges to the left with the peritoneum descending into the pelvis, and with that covering the descending colon and forming the mesentery of the pelvic colon. The arrangement of these layers in the right iliac region will be dealt with along with the cæcum and ascending colon. The length of the mesentery and the superficial position of the coils of small intestine account for the great mobility of enteric intussusceptions, and the ease with which they can be palpated. The mobility of the ileum explains the distance that this part of the gut may travel when included in an ileo-cæcal invagination; indeed, the size of an intussusception must depend to some extent on the length and extensibility of the mesentery. D'Arcy Power,[1] on measuring the mesentery in 44 children of different ages, found that its length was remarkably constant, and that, therefore, in proportion to the size of the body, the mesentery is longer in infants than in older children, a fact of no small significance when we remember that the large, rapidly travelling ileo-cæcal invaginations are practically confined to infant life. The same observer noted that, in some cases, the mesenteric glands are small, discrete, and seed-like; and that in others they are aggregated into large lymphoid masses. This will certainly have some bearing on the rate of congestion of the intussusception and the acuteness of the onset of symptoms.

The angle at which the ileum enters the cæcum is found to vary considerably in different individuals, and it is conceivable that this angle of incidence may have some effect in the induction of ileo-cæcal invaginations. When the last few inches of ileum slope upwards, forming an acute angle with the cæcum, a prolapse of the ileo-cæcal valve into the colon would be directed upwards and would lie in such an attitude that the peristalsis of the colon would tend to increase the tumour by drawing it upwards towards the hepatic flexure. In those cases, on the other hand, in which the ileum descends at its finish to form an

[1] Hunterian Lectures, 1897.

obtuse angle with the cæcum, any prolapse into the lumen of the large bowel would point downwards, and the effect of peristalsis would be to reduce the commencing invagination by pushing it up and thus prevent the formation of an intussusception. Treves[1] states that the small intestine usually ascends to its termination. D'Arcy Power[2] noted the angle in 38 bodies, and found that in 20 the axis of the ileum was horizontal, sloping upwards in 15, and sloping downwards in 3. As already stated, the terminal coils of the ileum descend into the pelvis about the end of the fourth month; and as the original angle of incidence is practically horizontal, it seems probable that this descent will cause the termination of the ileum to lie in a position of ascent towards the cæcum for a time at least; and it is just during the months following the date when this descent is known to take place that acute infantile intussusception is most common.

The large intestine at birth is a little over two feet in length, and nearly half of this is accounted for by the large pelvic colon. At the end of the fourth month the measurement is exactly the same; but the ascending, transverse, and descending colons are found to be longer by several inches, the growth having taken place at the expense of the pelvic colon, which has shortened to a corresponding extent. After this date the growth is steady and regular. At the end of the first year it measures about two and a half feet, and at the end of the sixth year about three feet. In a new-born infant the large intestine is practically of the same diameter as the small. During the first twelve months the growth in calibre of the colon is relatively enormous, particularly in the case of the cæcum. At the age of fifteen years the colon is about three times greater in diameter than the ileum.

The cæcum is usually taken to be that portion of the colon lying below the level of the lower margin of the termination of the ileum. During the later months of fœtal life, it descends from its position in the right hypochondrium, and is found at full time in the right iliac fossa. In this way is formed the ascending colon, and during its descent the cæcum becomes completely surrounded with peritoneum. The cæcum thus has no mesentery, and as far as I have been able to discover there is no authentic case on record in which one has existed. To this, in part, it owes its great mobility. At birth the cæcum is conical in shape. The internal, the anterior, and the postero-external longitudinal muscular bands are equidistant, and from their point of union at the extreme apex the appendix comes off. This state of matters may exist throughout life, and then we have what is known as the fœtal type of cæcum. The enlargement of the cæcum takes place by the growth of the

[1] *Op. cit.* [2] *Op. cit.*

portions between the longitudinal muscular bands and three saccules are formed. Rarely these saccules may grow equally, and then the apex with the appendix retains relatively its original position. In the vast majority of cases the saccule between the anterior and the postero-external bands grows out of all proportion to the others. The apex with the appendix becomes displaced inwards, upwards, and backwards, and this antero-external pouch comes to form the real apex of the cæcum. In some cases the growth of this pouch may be relatively so great that the appendix appears to spring from immediately below the ileo-cæcal junction. All authorities are agreed that variations in the anatomical arrangement of the colon are of great ætiological importance in intussusception. During the first months of life the colon, and particularly the cæcum, are in a constant state of growth and change of shape; and during this time its walls, especially, as may often happen when this growth oversteps physiological limits and becomes excessive, will be weak, unsuited to withstand abnormal influences, and prone to disturbances of function from slight causes.

The orifice of the ileum on the postero-internal aspect of the cæcum is guarded by the ileo-cæcal valve, which prevents regurgitation from the large to the small intestine. The valve consists of two semilunar folds formed by a reduplication of the mucous membrane and circular muscular coat. One of them is attached superiorly and the other inferiorly, the aperture between them being transverse in direction. At each side of this aperture the segments of the valve coalesce and are continued for a varying distance round the wall of the cæcum in the form of horizontal ridges, known as retinacula. The segments of the valve project into the lumen of the cæcum during the passage of bowel contents from the ileum, and this may be looked upon as their normal attitude; but when the colon and cæcum become distended the retinacula pull on the flaps and close the aperture. The ileo-cæcal valve forms the original apex in cases of ileo-cæcal intussusception, or, in other words, is the starting-point of the process. I am convinced that the presence of this valve, in conjunction, of course, with other factors, is of ætiological importance. I have examined the valve at numerous post-mortems on infants by opening the cæcum from the front and thus getting a view of the orifice *in situ*. The first point to be noted is that the mucous membrane lining the valve segments has a peculiar puckered appearance and projects slightly into the lumen of the colon. On making a mesial vertical section through the valve in the axis of the entering ileum, this appearance is seen to be due to a longitudinal folding of the mucous membrane, in

marked contrast to the transverse ridges of the ileum. I have had sections made of the cæcum of a child, aged six months, which shows the typical arrangement. Microscopically it can be seen that this puckered mucous membrane has beneath it an exceedingly loose sub-mucous tissue. In other words, the mucous coat of the valve is redundant and loose, and might easily under favourable circumstances prolapse into the lumen of the large bowel. I have never myself seen a condition that could fairly be termed prolapse; but in a few of the forty-four children's bodies that D'Arcy Power examined, the mucous membrane was distinctly prolapsed. Such a state of matters is not described as occurring in adults, and in about half-a-dozen adults whom I have examined post-mortem I have never found the same condition—at any rate never anything like so marked as is the rule in the infant. The importance of this is obvious. A prolapsed mucous membrane might easily be seized upon by the contracting colon and, other things being equal, form the starting-point of an ileo-cæcal intussusception. The second point of note is the extraordinary projection of the termination of the ileum into the colon (Fig. I.). It is usually stated that the ileo-cæcal valve in children is rudimentary and of little account. D'Arcy Power does not discuss this matter clearly, but he seems to support that view when he states that the aperture is usually round or oval, and speaks of the ileum as projecting from 4 to 7 millimetres into the colon. At first sight it would appear that this were so, but on closer study I think it will be seen that the larger part of the projection is formed by the valve itself, which is large and well developed. The valve segments only contain circular muscular fibres, and the base of each cusp may be said to be situated at the point of reflection of the longitudinal fibres from the

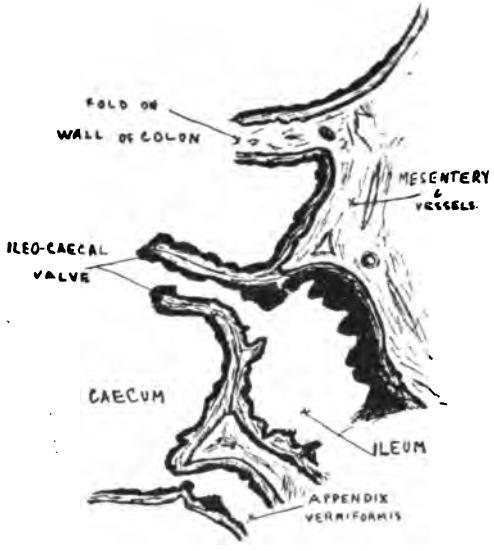

FIG. I. (drawn from section enlarged).
Section of Infant's Ileo-cæcal Region.

ileum on to the cæcum and colon respectively. On examining microscopically sections of an infant's ileo-cæcal region I find that fully four-fifths of the projection into the large bowel is accounted for by the valve segments themselves, assuming that this point of reflection constitutes the base of each cusp; and, as the naked-eye appearance of the specimen was typical, there is no reason to suppose that microscopically the arrangement is abnormal. This projection is relatively out of all proportion to what is found in adult life; and, apart from the above facts, I think it is more reasonable to suppose that in infants the valve is strongly developed, and that later the wall of the colon grows out of proportion to it, than to assume that there is a sort of static invagination of ileum into colon which recedes as development goes on. The projection, at any rate, must constitute one of the strongest predisposing anatomical factors to intussusception; and when it is present to a marked degree one might almost say that there is a constant incipient intussusception in existence.

The remaining portions of the colon require little notice. Their greatest importance anatomically, from the point of view of intussusception, lies in the situation of the different sections. As a whole the wall of the colon is puckered and pouched, and this explains the frequency of secondary invaginations when the colon forms the sheath of an intussusception. The descending colon is the most constant in position and length on account of its being a primary bowel loop. The hepatic flexure may occasionally be absent, the colon running obliquely across the abdomen from the cæcum to the splenic flexure. Such a condition is a persistence of the arrangement found in a four months' fœtus after the descent of the cæcum from the right hypochondrium. The splenic flexure is higher in position than the hepatic, and more deeply situated. The transverse colon varies considerably in position and mobility. In children, up to two years of age, it frequently shows a sharp bend with the convexity downwards just to the left of the middle line.

The variations occurring in the peritoneum, covering the colon and forming its mesenteries, are of very great interest in connection with the formation and course of intussusceptions involving the large bowel. The transverse colon and the pelvic colon invariably possess mesenteries, and these portions have therefore a large range of movement. The cæcum, as already stated, is completely surrounded by peritoneum and has no mesentery. In 100 bodies Treves[1] found that, contrary to the usual statements in books, a meso-colon on the left side is more common than on the right. His actual figures are: Descending

[1] *Ob. cit.*

meso-colon (no ascending), 22%; ascending meso-colon (no descending), 12%; both descending and ascending, 14%. Where no colic mesentery is present the peritoneum is reflected directly from the side of the colon on to the abdominal wall, and a larger or smaller portion of the posterior wall of the gut is in direct contact with the posterior parietes. When an ascending meso-colon is present its layers are directly continuous with those of the enteric mesentery; the right or outer layer being a continuation of the left or lower layer of the mesentery, and the left or inner layer a continuation of the right or upper layer of the mesentery. The absolute continuity of these mesenteric folds can easily be demonstrated at post-mortem examinations or during operations by pulling the gut at the ileo-cæcal angle downwards and outwards, by which means the peritoneum is put on the stretch. The lower inch or two of the colon is usually completely surrounded by peritoneum like the cæcum, the reflection in this plane not reaching as far down as the entrance of the ileum. In these cases it is obvious that the cæcum is anchored to the posterior parietes solely by the ascending meso-colon, and its mobility as well as that of the colon itself will depend upon the length of the colic mesentery. The ascending meso-colon is attached below along the lower margin of the kidney, and above along the inner margin of that organ. When there is no ascending meso-colon the gut is firmly fixed to the anterior aspect of the lower end of the kidney, and to the parietes along its inner margin by the reflection of the peritoneum on either side. Treves states that an ascending meso-colon is rare during fœtal life, and not so common at birth as in the adult. D'Arcy Power, as a result of his investigations, has shown that the mesenteries of infants are relatively much longer than those of older children. At a recent operation at the Edinburgh Children's Hospital, the sac of a left inguinal hernia in an infant was found to contain cæcum and appendix. In this case there must have existed an exceedingly long ascending meso-colon. In inguinal hernias on the right side in children it is quite common to find cæcum and even part of ascending colon. Even if we admit that an ascending meso-colon is rare in children we are justified in concluding that when it does occur it is long and allows of free movement. Without an ascending meso-colon it is impossible for an ileo-cæcal invagination to form at all, or at any rate to attain any dimensions. The ileum and cæcum might become invaginated so as to form the commencement of an intussusception, but further progress would be stopped, because an intussusception grows by the infolding of the wall of the colon, and its consequent movement in the direction of the rectum; and such infolding and

movement could not take place were the ascending colon firmly fixed to the posterior parietes. In such individuals there are only three possibilities: (1) That an intussusception begins and is unable to proceed further. A case of this kind must be extremely uncommon, as I find no record of one. (2) That it begins, but, only being an inch or two in length, it spontaneously reduces itself. There can be no absolute proof one way or the other of such occurrences. (3) That intussusceptions do not occur in individuals who have no ascending meso-colon. This last, to my mind, is by far the most likely explanation. If we grant this, then we must accept the logical consequence, namely, that mobility of the cæcum is of essential importance as a predisposing factor in intussuception; because, as I mentioned above, such mobility depends to a large extent on the presence or absence of an ascending meso-colon, and as far as I can see the presence of a meso-colon could have no other results which would affect the origin of invaginations. The transverse meso-colon is always ample enough to allow of any amount of invagination, and it can present no obstacle to the onward course of an intussusception. If the descending meso-colon be absent the descending colon can take no part in the formation of the intussusception, and the further progress must cease, although, of course, the tumour already formed may project for a considerable distance down the lumen of the descending colon, the latter forming the sheath. Such a state of matters would be found where the ascending meso-colon was present, but the descending absent. When the descending meso-colon is present and of sufficient length or extensibility, there is nothing to prevent the downward course of the tumour, the apex of which may eventually project from the anus.

Attention has been drawn by D'Arcy Power to the complexity of the peritoneal folds in the ileo-cæcal region and their importance in intussusception. The anatomy of the parts has been fully described by Lockwood and Rolleston.[1] The ileo-colic angle may be covered in anteriorly by a triangular piece of peritoneum called the ileo-colic fold, which transforms the angle into a fossa. Behind the ileo-cæcal angle there is a fossa running upwards parallel with the colon, and this fossa may be subdivided by the presence of an ileo-cæcal fold and a meso-appendix. Lastly, at the base of the cæcum and posteriorly a pouch runs upwards behind the ascending colon for a short distance, and this is termed the sub-cæcal fossa. These folds must all be drawn into an ileo-cæcal intussusception, and the degree of their size, vascularity, and complexity must to a certain extent determine the rate of congestion of the in-

[1] *Journal of Anatomy and Physiology*, vol. xxvi.

tussusceptum and the acuteness of the symptoms resulting therefrom.

The vermiform appendix is invariably included in ileo-cæcal intussusceptions. The meso-appendix is variable. Sometimes it is absent altogether. When present it may spring from the lower layer of the mesentery, from the colon, the cæcum, or the iliac fossa.

One point in the physiology of the ileo-cæcal part of the gut is worth mentioning. It is known that the peristaltic waves of the ileum cease at the ileo-cæcal valve, and that a fresh and independent peristalsis starts in the cæcum. There will thus frequently occur in this region a state of matters which greatly favours the formation of intussusceptions, namely, a firm contraction of one portion of the bowel associated with a relaxation of the portion immediately adjoining it.

Pathology.

I propose to deal first with the general pathology, and then to discuss the more minute changes occurring in the portions of bowel involved in an acute intussusception. Four distinct varieties of invagination are recognised. (1) Enteric. These are most frequent in the lower part of the jejunum. The next most common site is the ileum, in the proportion of about 4 of the former to 1 of the latter. They are usually short, involving not more than a few inches of the bowel. This is what one would expect, for the included part of the gut is of the same diameter as the sheath, and a sort of impaction occurs from the intense congestion and swelling. They are, as a rule, superficially situated, and extremely mobile, on account of the length of the mesentery. (2) Ileo-cæcal. These comprise a very large majority of the total cases. The ileo-cæcal valve forms the original apex, and the valve, or some portion of the cæcal wall adjoining it, travels foremost throughout the invagination's progress. The ileum is pulled in after it, and the increase in length of the tumour is accounted for by an infolding first of the cæcum and then of the colon. The apex is a more or less constant quantity, but the neck is always changing, the sheath or intussuscipiens being steadily turned in to form part of the intussusceptum. This is the mechanism of growth in all intussusceptions except the ileo-colic. The ileo-cæcal variety attains greater dimensions than any other form. It is not uncommon to find that the ileo-cæcal valve has traversed the whole colon and rectum and protruded from the anus. (3) Ileo-colic. This is an extremely rare variety. The terminal portion of the ileum is prolapsed through the ileo-

cæcal valve; and it is supposed that the tumour grows in length by more and more of the ileum (entering layer) being prolapsed through the valve. Some portion of the terminal part of the ileum forms the apex, and—unlike any other form of intussusception—the apex is a constantly changing quantity. It seems possible that this mechanism might take the place of that of the ordinary ileo-cæcal variety where there is no ascending meso-colon, and the sheath is prevented from being folded in at the neck by the fixity of the colon. Cases of ileo-colic intussusception are exceedingly severe and acute on account of the tight grip that the orifice of the valve takes of the ileum. (4) Colic. This form is similar in structure and mechanism to the enteric. A primary colic intussusception is somewhat uncommon, but ileo-cæcal invaginations are not infrequently complicated by secondary colic folds on their sheath. They are as a rule short, and are found most often in the descending colon.

As regards the relative frequency of the above forms all statistics agree that the ileo-cæcal are by far the most numerous. Leichtenstern, who collected records of over 500 cases, gives ileo-cæcal 44%, enteric 30%, colic 18%, and ileo-colic 8%. These percentages were calculated from cases occurring in adults as well as in children, and from both chronic and acute cases. Of 62 cases in children collected by Holt,[1] 74% were ileo-cæcal, 14% colic, 7% ileo-colic, and 5% enteric. These figures are probably a more correct representation of the relative frequency of acute ileo-cæcal in infants. Of the 59 cases tabulated later, 76.3% were ileo-cæcal, 13.6% mixed enteric and ileo-cæcal, 5% enteric, 3.4% colic, and 1.7% ileo-colic. The mixed enteric and ileo-cæcal referred to is a somewhat interesting variety. An enteric intussusception forms at the lower part of the ileum and ceases at the ileo-cæcal valve, which then in its turn becomes the apex of an ileo-cæcal intussusception which includes the original enteric. It is probable that cases described as ileo-colic are not infrequently of this type. Leichtenstern calls this form the iliaca-ileo-colica.

A rare form of intussusception occurs in connection with the appendix, when this structure is turned completely inside out and projects into the lumen of the cæcum. Such a condition associated with an ordinary ileo-cæcal intussusception was reported by Waterhouse,[2] and other cases are on record.[3] Not quite so uncommon is the intussusception of small intestine into Meckel's Diverticulum. Two cases have been reported recently

[1] "Diseases of Infancy and Childhood."
[2] Pathological Society of London, 1897.
[3] Ashby, *Treatment*, Nov. 25th, 1897.

by Parker and Southall.[1] Watson Cheyne[2] published a case, also recently, in which this condition was associated with a marked congenital stricture of the gut below the Diverticulum. He was able to find references in medical literature to sixteen cases of this type.

The intussusceptions frequently seen in children at autopsies, especially in those who have died of brain disease, are entirely different from the obstructive variety. They are usually multiple, always short, frequently retrograde, and more common in the small intestine than in the large. They show no congestion, and the lumen of the bowel is not narrowed. They are easily reduced by very slight traction. They are probably caused by irregular and spasmodic intestinal contractions occurring immediately before death.

The pathological changes that take place in an intussuscepted piece of bowel follow one another with alarming rapidity in cases in infants. The intussusception becomes strangulated in the intussuscipiens, and the after-changes are strictly analogous with those resulting from the strangulation of a piece of bowel in a hernial sac. The mesentery, lying between the layers of the intussusceptum, becomes tightly nipped, particularly at the neck; the blood supply is thus interfered with, and congestion, œdema, extravasation of blood, and gangrene follow. The rate at which these changes occur varies greatly in different cases. The differences in anatomical arrangement in different individuals doubtless afford a partial explanation of this, but when all is said we are far from understanding why one patient should be dead in 24 hours from the onset, and another under apparently similar circumstances should recover after 48 hours. The complexity of the peritoneal folds included in the mesentery, and the size and consistence of the glands, are important factors. The length of the mesentery will also have a considerable effect. When it is short very strong traction will be made on it before the tumour has attained a large size, with correspondingly great constriction of the included vessels. The opposite state of matters will be found in cases with a long mesentery, other things being equal. Clinical experience supports this theory. Large ileo-cæcal invaginations which have travelled right round to the descending colon are found to be comparatively little congested, easily reduced, and favourable to the patient. On the other hand, small tumours of the same type confined to the region of the ascending colon are tightly constricted, and can only be reduced with great difficulty, if at all. As already pointed out, enteric and ileo-colic intussusceptions are of a very acute nature. The traction of the mesentery has

[1] *Lancet*, Nov. 12th, 1904. [2] *Annals of Surgery*, vol. xl.

important effects on the shape of the tumour. It causes the intussusception as a whole to assume a curved form, with the concavity directed towards the base of the mesentery. Passing in between the entering and returning layers the taut mesentery causes the orifice at the neck to be elongated and slit-like, especially on the concave side. Within the sheath it drags the intussusception as a whole towards the mesenteric attachment, so that it is placed eccentrically and not in the same axis as the intussuscipiens. At the apex the mesentery pulls on the orifice of the intussusceptum, so that it becomes long and narrow instead of circular, and looks towards the mesenteric border of the receiving layer instead of directly down the lumen of the bowel. This pull on the apex may have even more marked results, especially in ileo-cæcal intussusceptions. On examining specimens of this variety, I have found it to be the rule for the opening of the ileum to be placed quite a considerable distance—sometimes as much as 1½ inches—from the foremost part of the intussusceptum, and to open directly towards the inner wall of the sheath, its position at the apex being taken by much congested and thickened cæcum (Fig. II.). Moreover, at operations it has been frequently noticed that a portion of one of the saccules of the cæcum—usually the anterior—has been the last portion of the tumour to reduce, and the last portion to reduce must have formed the true apex. After reduction, too, this portion of the saccule is seen to be dark, much congested, and to have a tendency to dimple in. It suggested itself to one's mind that this saccule might have been the starting-point of the invagination, as, at first sight, it appears that the apex would

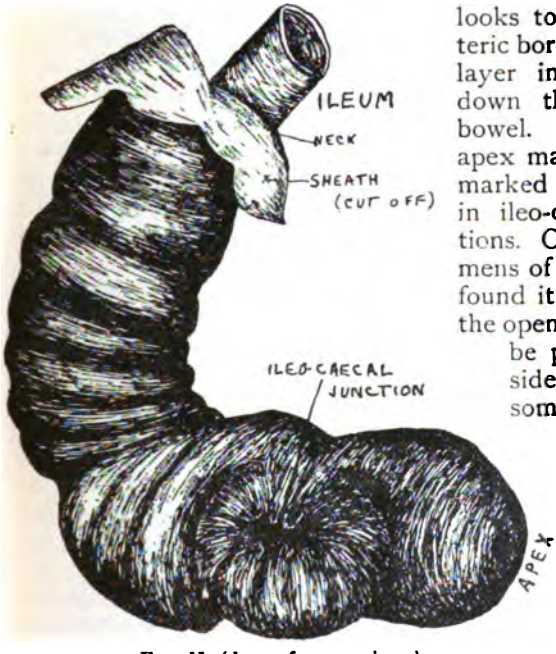

FIG. II. (drawn from specimen).
Ileo-cæcal Intussusception. Sheath removed.

necessarily be the part first turned in; but, on considering all the anatomical arguments in favour of these intussusceptions, starting at the ileo-cæcal valve, I have come to the conclusion that the traction of the mesentery offers a much more feasible explanation of this phenomenon. The intussusception starts at the valve, and for a time the opening of the ileum certainly forms the apex; but as the mesentery becomes more and more used up, and more tightly stretched, the traction on the apex pulls it towards the mesenteric border, and the portion of the wall of the cæcum farthest from the mesenteric border advances past the opening and takes its place. This is rendered all the more likely by the fact that the cæcum must be somewhat folded on itself to allow of its inclusion in the narrower colon, and there will be plenty of its wall to spare for the performance of such an evolution as I have described.

In enteric and colic intussusceptions the traction of the mesentery does not form such a marked feature, doubtless, in part at least, because these tumours are usually shorter. In them, consequently, the curved outline is not so definite, and the opening at the apex looks more or less directly down the lumen of the bowel below.

The changes in the bowel above an acute intussusception are limited to some congestion and dilatation, varying in degree upon the duration of the obstruction. I do not think that perforation at this site has ever been noted in an acute case. In the tumour itself, the intussuscipiens, as a general rule, shows comparatively slight changes. At operations it is frequently seen to be of a slaty grey colour, and much wrinkled and folded on itself, as if it were too large for the included intussusceptum. Sometimes it is more deeply congested and of a purplish colour. In enteric forms the sheath presents more congestion and tendency to gangrene than in the ileo-cæcal, probably because in the former the intussusceptum is more firmly impacted. The pressure of the convex border of the intussusceptum may produce ulceration of the mucous coat of the sheath, and even lead to perforation if the patient lives long enough without relief. As a result of forcible injection of fluid or gas per rectum, the serous coat of the sheath may split, or rupture of the whole wall may even occur. The same thing may take place during reduction by manipulation after laparotomy.

The changes in the intussusceptum are, for practical purposes, the only ones of essential importance in acute intussusception. In infants these changes are invariably of an exceedingly acute character. The intussusceptum is in a state of strangulation depending upon interference with the vascular supply from the compression of the vessels included in the mesentery at the neck

of the tumour. The first results are intense congestion, œdema, and extravasation of blood with consequent swelling. These are most marked at the apex and along the convex border of the intussusceptum, because those parts are least compressed, have most room to become distended, and are most remote from the source of blood-supply. The neck is, as a rule, too tightly constricted to show much congestion, and the concave border is tightly compressed by the traction of the mesentery. The returning layer, *i.e.* the layer next the sheath, is generally very much more congested than the central or entering layer; indeed, the latter may even be so compressed as to be smaller than normal, but this is unusual. It seems possible that the arrangement of the mesenteries at the neck of the tumour has something to do with this difference between the two layers. The returning layer is formed by a sharp folding on itself of the sheath at the neck; and the mesentery with its vessels, as well as the bowel wall, will be sharply bent at this spot with consequent compression against the edge of the neck. The mesentery of the entering layer—the direct continuation of the gut above—will lie more in a straight line or gradual curve, and will be subject principally to the annular constriction at the neck to which the returning layer is equally liable. These changes commence as soon as the intussusception has occurred, and they rapidly reach their maximum—in almost all cases within 36 hours, and in some within 12 hours. Death frequently takes place before any further changes have set in. The hæmorrhages into the congested areas may be small and scattered or in the form of large extravasations, splitting up the tissues and forming extensive clots. From the congested mucous surfaces blood escapes, and may pass down the bowel and be discharged per rectum. The portions too tightly compressed to show congestion are usually the seat of more serious changes than the engorged parts, and after reduction of the invagination much hæmorrhage and œdema may occur in these areas. There also œdema and degeneration of the muscular fibres are most marked, and may have serious results after reduction by causing paralysis of the gut.

If the strangulation persists, gangrene supervenes sooner or later. It is quite impossible to name a definite time after onset as being that at which gangrene of the intussusceptum will begin. It is usually stated to commence on the third or fourth day; but it may occur much earlier, even within the first 24 hours, as some of the cases tabulated later show. It is obviously a question of the acuteness of the process, and although one case of a certain type at a certain age may not be gangrenous after 3, 4, or even 5 days, we must not be

surprised should gangrene be found within one day in another case under apparently identical circumstances. In acute intussusception the gangrene rapidly involves the whole intussusceptum, but it appears in most cases to commence at the apex. In some instances, however, gangrene commences at the neck, and Treves[1] states that this is the rule. The returning layer is usually affected earlier and to a more marked degree than the entering layer. The whole mass may slough and be passed per rectum, and should the sheath and entering layer be firmly adherent at the neck a spontaneous cure may result. Occasionally, for some unexplained reason, the entering layer may slough first and pass down before the returning layer has separated, turning inside out as it does so by a gradual unfolding at the apex. In such circumstances the cylinder of bowel passed per rectum has its peritoneal covering inside and its mucous surface outside. D'Arcy Power[2] notes that in some cases a process of diffuse suppuration may take the place of gangrene, that in others a fibrous sclerosis of the intussusceptum may occur, and that in a few the intussusceptum may be converted into a mass of reticulin by tryptic digestion; but these terminations must be almost entirely confined to chronic invaginations, and may be ignored in connection with acute intussusception.

Adhesions between the peritoneal surfaces opposed to one another are of very variable occurrence. They form principally between the entering and returning layers, because their surfaces are in more or less constant contact. Only after cessation of growth of the intussusception can adhesions form at the neck, and the process rarely continues long enough in infants for this to take place to any extent. They are of little importance clinically, as they do not become sufficiently organised to be noticeable till the third day, and by this time the condition of an infant is so serious that peritoneal adhesions can hardly make the outlook more grave.

The pathology of intussusception, then, may be briefly stated to consist of acute strangulation and obstruction. The obstruction is due to three causes: (1) The congestion and swelling of the intussusceptum obliterates the lumen of the bowel; (2) the orifice at the distal end is slit-like and narrow from traction of the mesentery, and may even, as we have seen, be pressed against the inner wall of the sheath; (3) the whole mass is curved on itself, and this will further narrow the lumen of the bowel.

Irreducibility of an acute intussusception is due principally to the swelling of the intussusceptum. As this is most marked

[1] Intestinal Obstruction, p. 169. [2] *Op. cit.*

at the apex, it is usually the last inch or two that cannot be reduced, or offer the greatest obstacle to reduction. Twisting of the invaginated bowel in its longitudinal axis may occasionally present a complication preventing reduction. Excessive swelling of the convexity of the tumour is another cause. Ileo-colic intussusceptions are particularly difficult to reduce on account of the unyielding ileo-cæcal opening through which the intussusceptum has to be passed. Peritoneal adhesions, if present, are usually too soft and recent to offer any serious obstacle to reduction.

Although much can be learned by a naked-eye examination of an intussuscepted piece of bowel, it is only by careful microscopic study that we can determine the exact nature, site, and extent of the changes in the tissues. For this purpose, through the kindness of Mr Stiles, I obtained a complete ileo-cæcal intussusception, of which Mr Richard Muir prepared most excellent sections. The only authority who has gone into this matter thoroughly is D'Arcy Power,[1] and he has paid attention chiefly to the condition of the intussusception as a whole at the different stages. As I have already indicated, gangrene supervenes on congestion at a very varying period of the disease, according to individual circumstances, and the microscope can afford little additional information. Moreover, diffuse suppuration of the intussusceptum, or the passage of a slough after a process of fibrous sclerosis, or tryptic digestion, which has been so ably discussed by D'Arcy Power, are occurrences of extreme rarity in the acute infantile type. I therefore thought it more important for my purpose to take a typical case at a fairly advanced stage, and to study the relative condition and degree of change in the component parts of the tumour.

The sections were cut from a specimen from a male child aged five months, in whom the intussusception had reached the stage of irreducibility and commencing gangrene in about thirty-five hours from the onset, and had to be resected. The longitudinal sections (see Fig. III.) show very clearly the arrangement of the different layers and the gross pathological changes, as well as the microscopical condition. The sheath can be seen to be continuous with the colon at the distal end, and to bend sharply on itself to form the returning layer at the neck. The ileum is seen entering at the neck and terminating at the ileo-cæcal valve near the apex, where it becomes continuous with the returning layer. Half way along is a transverse section of the vermiform appendix. An enlarged lymphatic gland and the remains of the mesenteric folds are on the convex side of the tumour beside the appendix. These structures are usually

[1] Hunterian Lectures, 1897.

situated along the concavity between the layers of the intussusceptum. The shortness of the tumour and the plane of section probably explain this accidental appearance. What is more important to note is that the layers farthest away from the side of the appendix and mesentery show most swelling. The sheath consists of normal-looking large intestine. The returning layer is greatly thickened, particularly towards the apex end, on the side farthest from the mesentery. The apex itself, composed of cæcal wall, is enormously distended, and even with the naked eye it can be seen that the mucous membrane over this part of the bowel is absent. The orifice of the ileum, situated some

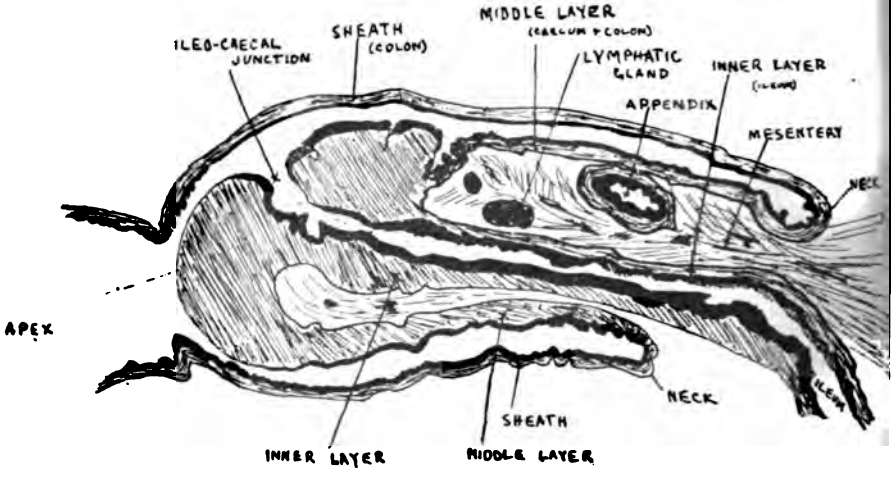

FIG. III. (drawn from section enlarged).
Longitudinal Section of Ileo-cæcal Intussusception.

distance behind the true apex, is also greatly engorged. The wall of the appendix is a good deal thickened, and beside it is a congested and enlarged lymphatic gland. The walls of the entering layer are greatly thickened, probably more than would be found in the majority of cases, but even here they are less so than those of the middle layer. There is a good deal of lymphatic engorgement beneath the mucous membrane of the entering layer.

In order to study the minute changes in the different layers at different parts of this tumour, I had a series of transverse sections cut at four levels—(1) through the neck, (2) passing through the appendix, (3) through the ileo-cæcal junction, (4) through the apex. It would serve no useful purpose to give here a detailed description of the appearances at each of these planes.

The serous coats showed little change, but in places there was some fibrinous exudate on their surfaces. The muscular coats contained varying amounts of blood extravasation, of œdema, and of degenerative changes in the muscle fibres. The submucous coats were everywhere œdematous, in some places to a marked degree, and showed some small cell infiltration. The vessels, particularly the veins, were distended. The mucous membranes presented much blood extravasation and degeneration of the epithelial elements, amounting in some parts to complete sloughing. In the ileum there was great engorgement of the interfollicular lymphatic tissue, and of the lymph nodes at the base of the villi. The most important facts gained from this microscopical examination may be summarised as follows:—

(1) The slightest effects in all layers are seen at the neck, and the condition becomes gradually worse as we proceed downwards, until at the apex the most advanced changes of all are found, namely, sloughing of the mucous membrane and gangrene. This is contrary to what Treves[1] states to be the rule, but it agrees with the condition found in many cases by D'Arcy Power,[2] who refers specially to infantile intussusception, which Treves does not. (2) The side of the tumour farthest from the mesentery shows the greatest swelling, but the degenerative changes are equally marked on both sides. (3) In all layers at all positions the submucous tissue is the most markedly affected. The mucous membrane comes next, and then in order the circular muscular layer, the longitudinal muscle and serous coat, and, lastly, the muscularis mucosæ. From the point of view of the after-results the effects on the mucous membrane and the circular muscular layer must be regarded as the most serious. D'Arcy Power lays great stress on the condition of the submucous coat, but from its structure and position we would expect it to show great œdema, and this would probably subside and cause no trouble after reduction if the more essential parts of the bowel wall were intact. (4) The middle or returning layer suffers most and the sheath least. The inner layer is much congested and its lymphatic system is engorged, but there are practically no signs of actual disorganisation. (5) The amount of blood extravasation in the mucous membrane is quite sufficient to account for the passage of blood per rectum. The blood probably comes both from the sheath and the middle layer, but principally from the latter.

Accurate knowledge of these changes cannot fail to be of assistance when we are searching for signs of gangrene, etc., at operation, and in guiding us as to which portion of the bowel

[1] "System of Medicine," Clifford Allbutt. [2] *Op. cit.*

will require the most delicate manipulative treatment. The condition of the circular muscle explains the paralysis of the gut and consequent obstruction that sometimes persist after reduction, and gives one clear indication for after-treatment, namely, to get the bowels moved as soon as possible.

Ætiology.

Before entering on the clinical part of the subject, I wish to sum up shortly what little is known as regards the ætiology of intussusception. It would profit little to enter into a discussion of the many vague and elaborate theories that have been formulated, for although many of them may be in part correct, none can be entirely satisfactory, as it is certain that we have to deal with a disease that has a variety of causes, according to the age of the individual and the portion of the intestine affected. Nothnagel's experiments on animals [1] may be taken to have afforded scientific proof of what has always been a matter of clinical conjecture, namely, that irregular and disordered intestinal contraction is the most important factor in all cases. By stimulating one portion of the intestine and getting it to contract vigorously he got a temporary slight retrograde invagination above the point of stimulation, and a typical descending intussusception below. The contracted portion passes into the comparatively relaxed part below it, not by virtue of the propulsive power of its own peristalsis—as one is surprised to see sometimes stated, as if the intestine could work itself along like a snake—but by the action of its longitudinal muscular fibres drawing the relaxed segment over the contracted one for a short distance, after which the relaxed part contracts on the included intussusceptum and moves it along as it would any other foreign body. That such irregular intestinal contraction, produced presumably by digestive disturbances within the bowel or by nervous influences acting from a distance, is a factor in all cases may be accepted as indisputable; but with regard to infant life we have further to explain the overwhelming preponderance of invaginations at one point in the bowel, the ileo-cæcal junction. I have attempted to show that the anatomical relations of the gut in this region are particularly favourable to the formation of intussusceptions. The points of greatest importance are probably the projection of the ileo-cæcal valve and the terminal portion of the ileum into the colon, and the mobility of the cæcum and colon allowing of commencing invaginations from change of relative position. The influence of individual variations on the occurrence of in-

[1] *Vide* "Intestinal Obstruction," Treves, p. 172.

tussusception, and its extent and variety when it does occur, I have already dealt with. In addition, Leichtenstern has pointed out that violent contraction of the terminal portion of the ileum will tend to produce prolapse of the mucous membrane into the colon in the same way as tenesmus and straining produce prolapse of the rectum.

Various exciting causes have been determined in connection with intussusception in adults, and in adults it is the rule to find some definite cause, such as a tumour or a polypus. It is the very opposite with children. The nearest one can get to an exciting cause as a rule is some vague gastro-intestinal disturbance. In some cases the history of such is quite definite—for instance, diarrhœa for some days previous to the attack, or constipation followed by colic—in others perfect health seems to have existed right up to the onset. In the irritable digestive and nervous systems of children very slight causes may suffice to start spasmodic bowel contraction. Moreover, as Treves [1] suggests, attacks of ordinary infantile colic may actually represent a small bowel invagination which soon resolves. At any rate such colicky attacks are very common in babies, especially if unsuitable food or severe purges have been given ; and it is quite possible that the commencement of an intussusception is present during these seizures, although, of course, it is as a rule only when symptoms of strangulation and obstruction ensue that we have an opportunity of seeing the patient. Even if it were otherwise it is very doubtful if any diagnosis could be attempted. Unsuitable articles of diet, such as raw apples, oranges, etc., are frequently blamed for bringing on an attack, and the fact that the great majority of cases occur among the poorer classes lends support to such views. Wiggin [2] believes that sudden and violent movements or jolts have a causative effect, and this theory fits in with what I suggested above as regards the mobility of the cæcum.

Clinical.

I shall now give a full account of the seven cases of acute intussusception that came under my own direct observation.

CASE A. Male. Age 6 weeks. Admitted 12th November 1903.

History.—On morning of 11th he woke up suddenly with a strange cry, and almost immediately vomited violently. He drew his legs up as if he had severe abdominal pain. During

[1] "Intestinal Obstruction." [2] *Lancet*, 28th August 1897.

the whole of yesterday the vomiting, pain, and crying continued. The pain came at intervals of from quarter to half an hour, and lasted for a minute or two. He refused to take the breast at all. The bowels were confined all day until 7 P.M., when he passed about a dessertspoonful of bright red blood and some fæces. He passed a restless night, the vomiting and pain continuing as before. At 11 P.M. and 1 A.M. he again passed blood by the bowel in larger quantities and mixed with mucus. He attempted to take the breast once or twice this morning, but vomited immediately. The symptoms continued unabated until admission. Latterly he has been quiet and rather drowsy between the spasms of pain, and seemed much exhausted.

Previous Health.—Has had occasional attacks of vomiting after being fed, not accompanied by pain. A right inguinal hernia was noticed when he was fourteen days old, and it has come down occasionally since.

Family History.—Mother and father healthy. Three other children; one boy is ruptured.

State on Admission.—Patient does not seem to be in much pain at present. He is quiet and lies in a drowsy sort of condition with eyes half closed. The face has a drawn collapsed expression, especially round the mouth, and the eyes are somewhat dull and sunken. When the abdomen is touched he draws up his legs and gives a weak, short cry. Pulse, 140, regular, small and weak. Respirations, 40. Temperature, 99°. Leucocyte count, 17,812 per c.m. The abdomen is slightly distended, but it is not rigid, and it moves freely with respiration. There is visible fulness in left lumbar and iliac regions. On palpation there is a sense of emptiness in the right iliac region, and in the left lumbar and iliac regions a hard elongated tumour can be felt more or less vertically placed. On rectal examination one can feel about 2½ inches from the anus a firm, rounded projection in the lumen of the bowel. The rectal examination causes great pain, and when the finger is withdrawn it is covered with blood.

Operation.[1]—3.30 P.M., 32½ hours after onset of symptoms.

Chloroform was administered and a vertical incision, 2½ inches long, was made through the right rectus muscle, close to the middle line above the umbilicus. The abdominal cavity was opened in the same line. Coils of distended and congested small intestine escaped and were covered with hot swabs. The intussusception was lifted into the wound. It was of the ileo-cæcal variety and about 4 inches long. Gentle pressure with the fingers from below reduced all except the last inch or so.

[1] This patient was operated on by Mr George Chiene.

This was covered with a swab and squeezed gently for a minute or two, after which reduction was completed by pressure from below. The mesenteries of the small intestine and ascending colon were fixed together with two catgut sutures with a view to preventing recurrence by making the ileum descend towards the cæcum. The bowel was douched with hot saline solution and returned to the abdomen. The abdomen was closed by one layer of silkworm-gut sutures and the skin edges were united with horsehair.

On return to bed the patient was considerably collapsed. He was surrounded with hot bottles and given 2 ounces of saline solution and 30 minims of brandy by the rectum. During the first hour his facies and pulse improved rapidly. At 6.30 P.M. he was given 30 minims of Henry's solution. At 8 P.M. he was greatly better, crying loudly and throwing his limbs about. He was given a small enema, and as a result passed flatus. Shortly after another saline and brandy was administered. The bowels moved twice during the night and there was no vomiting. Early next morning he was started on small quantities of milk. Thereafter his recovery was uneventful, although his convalescence was protracted by digestive disorders resulting from the artificial feeding. He was discharged in excellent health on the 5th of December.

CASE B. Male. Age 6 months. Admitted 23rd November 1903.

History.—Patient was quite well until yesterday afternoon at four o'clock, when he suddenly began to scream as if he had severe pain in stomach. In a few minutes he vomited, and the vomiting continued almost incessantly for about fifteen minutes. During the night he had frequent attacks of pain and screaming, and he vomited every time an attempt was made to feed him, as well as at other times. His bowels did not move till 7.40 this morning, when he passed a copious loose motion containing a large amount of blood and a little mucus. The bowels have not moved since. The vomiting and pain have continued and he has got rapidly worse.

Previous Health.—Good. Has been fed entirely on the breast.

Family History.—Father and mother healthy. No other children.

State on Admission—Well nourished child. Suspiciously quiet. Does not cry unless abdomen is touched. Pale. Mouth drawn. There is a certain amount of collapse. Pulse, 140, fairly strong. Respirations, 50. Temperature, 99.2°. Leuco-

cyte count, 18,216; Polymorphonuclears, 76 per cent. The abdomen is not distended. It moves freely on respiration. There is no visible tumour. As soon as the hand is laid on the abdomen the muscles become firmly contracted and nothing can be palpated. Chloroform was therefore given, and then a small elongated tumour could be felt, deeply situated in the right hypochondriac and epigastric regions. The tumour was transverse in position and very moveable. Nothing could be palpated on examination per rectum.

Operation.—4.30 P.M., 24½ hours after onset.

The abdomen was opened in the middle line by a vertical incision, 3 inches long, with its centre at the umbilicus. The small intestine was not congested and only very slightly distended. The tumour was brought into the wound with difficulty, on account of its deep position. It was found to be a double intussusception, consisting of ileum into ileum, starting about 2 inches above the valve, and then of this into cæcum with the valve at the apex. The ileo-cæcal was first reduced with difficulty and then the enteric. There was great swelling and congestion of the gut, and in places it was dark in colour. The intestines were returned to the abdomen and the wound closed.

When put back to bed he was given 4 ounces of saline and a teaspoonful of brandy per rectum. His after progress is interesting, as for more than two days his condition remained critical, and it was impossible to say how things were going to go. Cases of strangulated hernia frequently behave in exactly the same manner when doubtful bowel has been returned to the abdomen. This patient's temperature rose rapidly after operation, and at midnight it was 105.6°. His pulse was 190 and full in character. Respirations, 80. Leucocytes, 34,375; Polymorphonuclears, 89 per cent. He was extremely restless and cried a good deal. His eyes looked glazed and kept jerking upwards in a somewhat ominous manner. The salines and brandy were continued every four hours. He did not sleep at all and next day, although he was able to take some milk, his pulse was weaker, his fontanelle depressed, and altogether things looked bad. Three ounces of fluid were injected into the axilla, morning and evening. His bowels moved twice, but there was more mucus present than fæcal matter. He was given calomel, ⅛th grain, every two hours. As the day went on he seemed to get weaker, and at night he vomited several times. The infusion of saline was continued every six hours. Next day (25th) he was distinctly worse. He was unable to suck and had to be fed with a spoon. His breathing was rapid and shallow and his expression bad. Leucocytes, 29,680; Polymorphonuclears, 89

per cent. Treatment was continued as before. At night he slept quietly for the first time and next morning he was much better. Leucocytes, 10,435; Polymorphonuclears, 58 per cent. The infusion and enemata were stopped. The calomel was continued and he was given a little brandy by mouth. On the 27th he developed a little bronchitis, which retarded his recovery, but otherwise he steadily improved, and on the 30th his temperature was normal, pulse, 128 and respirations, 44. He went home on the 9th of December in perfect health.

CASE C. Male. Age 7 months. Admitted 23rd December 1903.

History.—At 11 P.M. on the night before admission he woke up suddenly, and after whimpering uneasily for a few minutes he began to scream, drew up his legs and kicked, and seemed to have great pain in the belly. A few minutes later he vomited. In about an hour the bowels moved fairly well, but there was blood in the motion. Since then the bowels have not moved. Attacks of pain and screaming recurred at short intervals throughout the night and he vomited several times. This morning he took the breast once or twice but vomited immediately thereafter. He was given some castor oil but vomited this also. The symptoms continued as above until admission.

Previous Health.—Entirely satisfactory. Breast fed. No illnesses.

Family History.—Father and mother healthy. Only other child was premature and died shortly after birth.

State on Admission.—Fat, well-nourished child. He is quiet and a good deal collapsed. The face is pale and drawn. Pulse, 116. Respirations, 38. Temperature, 99°. Leucocytes, 18,000 The pulse is regular and of fairly good volume. The abdomen is only slightly distended and it moves freely with respiration. There is visible fulness to the left of and below the umbilicus, near the middle line. On palpation the abdomen is flaccid. There is emptiness in the right iliac region, and in the umbilical and hypogastric regions, to the left of the middle line, there is a hard, cylindrical, elongated mass placed obliquely with its lower end nearer the mid line than its upper. Per rectum one can feel at the tip of the little finger a firm rounded projection within the bowel. The examining finger is covered with blood.

Operation.—4.30 P.M., 17½ hours after onset.

The abdomen was opened as in the last case. The small intestine was very little distended and not congested. The intussusception when brought into the wound was found to be

of the ileo-cæcal type, and about 4½ inches long. Reduction was accomplished by expression from below without difficulty until the last inch was reached, and this required careful and patient manipulation. A rounded area, about the size of a penny, on the antero-external aspect of the cæcum was thickened, dark in colour, and dull and roughened on its surface. The intestines were returned, and the abdomen closed as before.

There was hardly any collapse after the operation. Six ounces of saline were infused under the skin, and at 7 P.M. three ounces were given by the rectum. At 11 P.M. this latter was repeated, and calomel, $\frac{1}{12}$th grain, was ordered to be given, two hourly. Milk was given by the mouth at 10 P.M. and at regular intervals thereafter. He made an uninterrupted recovery, and was discharged on the 4th of January.

CASE D. Male. Age 11 months. Admitted 12th January 1904.

History.—On the 10th of January, about 9 A.M., when he awoke he began to cry and draw up his legs as if he had abdominal pain. The pain recurred at intervals all morning, and he refused food. At 3 P.M. he vomited, and an hour later his bowels moved. There was no blood in the motion. The intermittent pain and vomiting continued all night, and he did not sleep at all. Two or three normal motions were passed. Yesterday morning the stools were noticed to be of a greenish colour, but otherwise his condition was as before. In the afternoon dark red blood was noticed in the motions. Since then the bowels have moved four times, and every time there has been a considerable amount of blood—latterly of a bright red colour. He did not sleep last night, and the attacks of pain and vomiting continued as before.

Previous Health.—Good. Breast fed, but latterly he has got porridge, soup, etc., in addition. No previous illness or intestinal disturbance.

Family History.—Father and mother healthy. One other child—healthy.

State on Admission.—Big, sturdy boy. Rather drowsy and apathetic. Face rather pale. Pulse, 120, regular and of good volume. Respirations, 30. Temperature, 97.2°. The abdomen is a little distended, moves freely with respiration, and there is visible fulness in the left lumbar and iliac regions. Palpation causes pain, but the abdominal wall is not rigid. There is a large cylindrical tumour on the left side of the abdomen, sloping obliquely downwards and inwards from the lumbar into the iliac

region. The lower end of the tumour cannot be defined. Per rectum a hard, rounded projection can be felt, about 2 inches from the anus.

Operation.—11 A.M., 50 hours after the onset of symptoms.

The abdomen was opened by a vertical mesial incision about 3 inches long, with its upper end about 1 inch above the umbilicus. Some coils of normal small intestine and a few teaspoonfuls of slightly turbid fluid escaped. The intussusception was 5 inches long, and of the ileo-cæcal variety. The sheath was loose and wrinkled, and there were two secondary invaginations of colon into colon. These could hardly be termed intussusceptions, as similar infoldings could be made and unmade without difficulty at any part of the colon. The tumour was reduced with comparative ease. The end of the ileum and the cæcum were deeply congested. A portion of the anterior cæcal wall was dark, thickened, and with a tendency to dimple in, as in the last case. This was the last part of the tumour to reduce, as it was also in Case C. After the operation the pulse was good and breathing quiet. He was given a saline injection and a teaspoonful of brandy by the bowel. He slept quietly for several hours. The salines and brandy were repeated every three hours until next morning. At 8 P.M. a little water was given by the mouth, as he seemed thirsty. At 10 P.M. milk feeding was started, and also calomel, $\frac{1}{8}$th grain, two hourly. The bowels moved freely next day, and his recovery was uneventful. He was discharged on the 30th of January.

CASE E. Male. Age 3 months. Admitted 23rd February 1904.

History.—Yesterday morning, at nine o'clock, he awoke suddenly, cried loudly, and showed signs of pain in stomach. His mother found that he had passed a copious motion streaked with bright red blood. The pain subsided in a minute or two, and he was given a feed which he at once vomited. Throughout the day he kept dropping off to sleep, and then starting up with pain and vomiting. He also vomited every time an attempt was made to feed him. On five occasions he passed mucus and blood, but never any quantity of fæcal matter. During the night and to-day four more similar motions were passed. He had a fairly quiet night, but during the day the attacks have been more frequent, and the mother says that his condition has become rapidly more serious.

Previous Health.—Breast fed until two months old. Since then he has lived on Nestlé's milk, oat flour, and Allenbury's

food. He has had occasional attacks of vomiting. Two days before the onset of the present illness he was rather constipated, and was given a teaspoonful of "fluid magnesia."

Family History.—Only child. Father and mother healthy.

State on Admission.—Not a very well-nourished baby. Distinctly collapsed. Face pale and drawn. Eyes sunken and expressionless. Pulse, 124, regular, weak and small. Abdomen shows slight general distension. There is no rigidity. The left side of the abdomen is distinctly full, especially in the upper part. On palpation the right iliac region is markedly empty. A cylindrical, sausage-shaped, deeply-situated tumour can be felt in the upper part of the abdomen, horizontally placed, two-thirds of it being to the left of the middle line.

Operation.—9.30 P.M., 36½ hours after onset.

The intussusception—an ileo-cæcal one, about 3 inches long—was delivered and reduced, as in the other cases. No difficulty was experienced, except with the last portion. The last part to unfold was again a pouch of cæcum, this time on the postero-external aspect. After reduction this portion was seen to be dark, thickened, and dimpled in. The lower two inches of the ileum were much congested and thickened. The abdomen was closed as above.

There was considerable collapse after the operation, and 5 ounces of saline and 15 minims of brandy were infused under the skin of the axilla. By midnight he was much better, and was given water by the mouth. At 4 A.M. on the 24th milk feeding was started, and $\frac{1}{12}$th grain calomel given, two hourly. The bowels moved in the afternoon. He was discharged on the 12th of March, after an uninterrupted recovery, and in much better condition than before the attack.

CASE F. Male. Age 4 months. Admitted 7th March 1904.

History.—Patient was in good health until 9 A.M. yesterday, when he awoke suddenly and began to cry and twitch his legs as if he had abdominal pain. His mother gave him three teaspoonfuls of castor oil. The attacks of pain recurred about every half-hour, but he took the breast well and did not vomit until 1 P.M. After this the vomiting was severe and frequent. The bowels were confined all day until 8 P.M., when he had a small motion consisting chiefly of blood and mucus. He did not vomit during the night, and he slept fairly well, but wakened up frequently screaming with pain. At 6 A.M. to-day he vomited again, and has vomited frequently since, especially when attempts were made to feed him. The bowels did not

move again till 7 A.M., when he again passed blood and mucus. At 2 P.M. this was repeated. He has been quiet and drowsy all day except for the attacks of pain.

Previous Health.—Has had one or two slight attacks of bronchitis. Breast fed, and has had bread and milk in addition lately.

Family History.—Father and mother healthy. Four other children healthy. One child still-born.

State on Admission. — Rather a delicate looking child. Prominent veins on head. Curious long-shaped head and narrow forehead. Very much collapsed. Quiet. Pale. Lips livid. Eyes glazed. Does not seem fully conscious. Pulse, 130, almost imperceptible. Respirations, 48, shallow. Temperature, 97·6°. Shortly after admission he vomited some dark coffee-grounds material. Abdomen somewhat distended, but not rigid. A hard, elongated tumour can be felt, deeply placed under the right costal margin, running obliquely from below upwards and to the left. Nothing can be made out per rectum.

Before operation 2½ ounces of saline, along with 10 minims of brandy and $\frac{1}{200}$th grain of strychnine were infused under the axilla.

Operation.—7.30 P.M., 34½ hours after onset.

On opening the abdomen distended coils of small intestine and a much distended stomach escaped. The invagination was ileo-cæcal and about 3½ inches long. The last portion was extremely badly nipped, and was reduced with great difficulty. The cæcal pouches were reduced last, and they were very dark and thickened. The antero-external one particularly was quite black, and it was inverted by means of fine Lembert silk sutures. There was a rent in the peritoneum covering the cæcum, and this was closed with silk sutures. It was found impossible to return the distended stomach and intestines to the abdomen. The stomach was therefore punctured with a trocar and gas allowed to escape. The puncture hole was then closed with silk. Even then the viscera were only returned with great difficulty. $\frac{1}{200}$th grain strychnine was given during the operation.

On return to bed the patient was extremely collapsed. Pulse imperceptible. He vomited a large quantity of dark brown fluid. Six ounces of saline + 20 minims of brandy and $\frac{1}{100}$th grain strychnine were infused. He improved a little after this, but the vomiting continued. His stomach was therefore washed out, and the vomiting then ceased. After midnight he became steadily weaker and died at 3 A.M. No post-mortem examination was allowed.

CASE G. Male. Age, 2 years and 9 months. Admitted 21st March 1904.

History.—On the 19th March he ate an orange, and the following day it was noticed that he had passed undigested pieces of orange. Otherwise he was quite well. This morning he took a good breakfast. At 10 A.M., while playing outside, he was suddenly seized with severe pain across the bowels, vomited violently, and turned very pale. He was put to bed, and given half-an-ounce of castor oil, which he promptly vomited. At 11 A.M. he was given a water enema, which was returned unaltered. The pain and vomiting continued. Half-an-hour later another enema was given, and this time some blood was passed. Since then he has had one motion consisting of blood and mucus. During the last four hours the symptoms have been less severe, and he has slept a good deal. He has not been fed all day.

Previous Health.—Good. Had whooping-cough two months ago.

Family History.—Father and mother healthy. Nine other children, all healthy. One boy was ruptured as an infant. One girl died of tuberculosis, aged fifteen years.

State on Admission.—Healthy looking, well nourished boy. Quiet and rather drowsy. Good colour. Practically no collapse. Pulse strong and steady, 120. Respirations, 28. Temperature, 99°.

Abdomen moves freely, and is not distended or rigid. There is distinct fullness on the right side above the umbilicus. A small elongated tumour can be felt in this region, almost parallel with the costal margin. It is movable, but not hard or well defined. Some distance below this in the right iliac region a smaller, round, hardened mass can be felt. Nothing can be palpated per rectum, and there is no blood on the finger when it is withdrawn.

Operation.—8.30 P.M., 10½ hours after onset.

A short ileo-cæcal intussusception about two inches long was found in the position of the upper tumour. It was very easily reduced. The appendix was long, and hard at the tip. It was removed. A mass of enlarged glands was found in the enteric mesentery, in the position of the lower tumour.

There was no collapse and no sickness after the operation. No stimulants were given. At 4 A.M. on the 22nd milk feeding was commenced. One-sixth grain calomel two-hourly given. At 8 P.M. he was rather restless, and as the bowels had not moved $\frac{1}{200}$th grain strychnine was given hypodermically. At 1 A.M. on the 23rd this was repeated, and an hour later the bowels moved—a copious motion, foul and mixed with mucus. As

the day went on he got worse, and towards evening his pulse and breathing became rapid and his temperature rose. As nothing could be found in the lungs to account for this, I opened the wound and explored the abdomen with my finger. Apart from some thickening in the region of the cæcum nothing could be felt. A gauze drain was put in. The foul slimy stools persisted for a day or two, and the temperature rose to 105° the next evening, but thereafter he improved steadily. The wound healed well, and he was discharged on the 16th of April.

As I have written these cases fully out, it will hardly be necessary to give a detailed account of the other fifty-two cases of intussusception at the Children's Hospital of which I have obtained records. I have merely tabulated the chief points of interest of all the cases, including the above seven.

One or two of the cases recorded are over two years of age, and therefore could not properly be called infants. The disease in these cases, however, was of the acute type, and I think it would have been a pity to omit them. The cases are numbered for convenience in reference. The date in the second column is the day on which operation was performed. The figures under "Duration" represent the number of hours between the onset of symptoms and the operation. The time of survival after operation is given in hours. "Previous Disturbances" means gastro-intestinal disorders immediately preceding the attack.

The following contractions are used:—

M. = Male.
F. = Female.
I.C. = Ileo-cæcal.
E. = Enteric (under "Type").
C. = Colic.
R. = Right.
L. = Left.
L.L. = Left Lumbar.
R.L. = Right Lumbar.
I. = Iliac.
U. = Umbilical.
H. = Hypogastric.
L.H. = Left Hypochondriac.
R.H. = Right Hypochondriac.
E. = Epigastric (under "Position").
Lap. = Laparotomy.
Res. = Resection of bowel.
D. = Death.
R. = Recovery.

No.	Date.	Age.	Sex.	Duration. Hrs.	Type.	Passage of Blood.	Palpable per Rectum.	Position of Abdominal Tumour.	Treatment.	Time of Survival. Hours.	Previous Disturbances.	Result.	Remarks.
1.	7/3/98	$1\frac{4}{12}$	M.	46	I.C.	+	+	L.L : L.I.	Lap.	10	—	D.	
2.	18/5/99	$1\frac{5}{12}$	M.	52	I.C.	+	—	R.I.	Lap.	12	—	D.	
3.	18/6/99	$1\frac{6}{12}$	M.	12	I.C.	+	+	L.I.	Lap.	44	+	D.	Attack of pain, vomiting, and passage of blood five days previous. Recovery without treatment.
4.	28/9/99	$1\frac{3}{12}$	M.	24	I.C.	+	—	R.I.	Lap.	R.	+	R.	Found to have reduced itself by time abdomen was opened.
5.	19/10/99	$1\frac{5}{12}$	M.	19	I.C.	+	+	L.L.	Lap.	R.	+	R.	Diarrhœa for a week before onset.
6.	23/4/00	$1\frac{6}{12}$	M.	41	I.C.	+	—	L.I.	Lap.	12	—	D.	Temperature 107° at death.
7.	12/12/00	$1\frac{0}{12}$	M.	$3\frac{1}{2}$	E : I.C.	+	—	R.L : U : E.	Lap.	10	+	D.	P.M. Gangrene of ileum.
8.	24/11/00	$1\frac{6}{12}$	M.	22	I.C.	+	—	L.I.	Lap.	R.	+	R.	Had fæcal vomiting.
9.	1/3/01	$1\frac{6}{12}$	F.	18	I.C.	+	+	L.I : L.L.	Lap.	6	+	D.	Vomited coffee-grounds material after operation.
10.	26/3/01	$1\frac{4}{12}$	M.	50	I.C.	+	+	L.I.	Lap. Res.	2	—	D.	Intussusceptum gangrenous.
11.	6/6/01	$2\frac{6}{12}$	F.	96	E : I.C.	+	?	?	Lap. Res.	7	+	D.	Had whooping-cough.
12.	7/7/01	$1\frac{4}{12}$	M.	24	I.C.	+	—	E.	Lap. Res.	144	+	D.	P.M. Peritonitis.
13.	1/11/01	$1\frac{3}{12}$	M.	24	E.	+	+	R.I.	Lap. Res.	0	+	D.	Intussusception a few inches above ileo-cæcal valve. Gangrene.
14.	6/2/02	$1\frac{6}{12}$	F.	?	Double E.	+	—	R.L.	Lap. Res.	16	—	D.	First onset of symptoms 12 days before admission. Relief and apparent recovery by injection on 5th and 10th days.
15.	9/6/02	$1\frac{5}{12}$	M.	48	I.C.	+	—	?	Lap.	4	+	D.	Had bronchitis.
16.	30/6/02	$1\frac{0}{12}$	M.	40	I.C.	+	+	L.I.	Lap. Res.	16	—	D.	Paul's tubes used.
17.	4/8/02	$1\frac{4}{12}$	M.	$2\frac{1}{2}$	I.C.	+	—	E.	Lap.	R.	—	R.	

18.	15/8/02	$\frac{3}{12}$	F.	33	I.C.	+	+	L.I.	Lap.	9	+	D.	Gangrenous tumour fixed outside abdomen.
19.	2/10/02	$1\frac{6}{12}$	F.	53	I.C.	+	+	U : L.L.	Lap. Res.	11	—	D.	Gangrene of intussusceptum.
20.	20/10/02	7	F.	72	E.	—	?	R.L : R.I.	Lap. Res.	72	+	D.	History of prolapsus ani.
21.	7/11/02	$\frac{5}{12}$	M.	35	I.C.	+	?	R.L.	Lap. Res.	7	+	D.	
22.	21/11/02	$\frac{10}{12}$	M.	$7\frac{1}{2}$	I.C.	+	?	R.L : U.	Lap.	R.	+	R.	Appendicectomy.
23.	3/12/02	$\frac{4}{12}$	M.	48	I.C : C.	+	+	L.L : L.I.	Lap.	4	+	D.	Secondary invagination of sheath, 3 inches long, at splenic flexure.
24.	20/1/03	$\frac{5}{12}$	M.	70	I.C.	+	+	L.L : L.I.	Lap.	$5\frac{1}{2}$	—	D.	
25.	30/1/03	$\frac{1}{12}$	M.	36	C.	+	+	L.L : L.I.	Lap. Res.	12	+	D.	10 inches of transverse and descending colons resected.
26.	10/2/03	3	F.	15	I.C.	+	+	L.I.	Lap.	12	+	D.	Appendicectomy.
27.	16/2/03	$1\frac{4}{12}$	M.	16	I.C.	+	+	R.I.	Lap.	51	—	D.	Appendicectomy.
28.	21/2/03	$\frac{6}{12}$	F.	11	E : I.C.	+	+	R.L : E.	Lap.	$14\frac{1}{2}$	—	D.	Enteric intussusception a few inches above valve.
29.	4/7/03	$\frac{9}{12}$	M.	15	I.C.	+	+	L.L : L.I.	Lap. Lateral Anastomosis.	3	+	D.	Irreducible. Tumour left attached outside abdomen.
30.	15/8/03	$\frac{4}{12}$	F.	22	I.C.	+	+	L.L : L.I.	Lap. Res.	10	+	D.	P.M. Peritonitis.
31.	1/9/03	$\frac{4}{12}$	M.	?	I.C.	+	+	L.I.	Lap. Res.	2	—	D.	
32.	12/11/03	$1\frac{1}{12}$	M.	$32\frac{1}{2}$	I.C.	+	+	L.I.	Lap.	R.	+	R.	Case A.
33.	23/11/03	$\frac{6}{12}$	M.	$24\frac{9}{12}$	E : I.C.	+	—	R.H : E.	Lap.	R.	—	R.	Case B.
34.	23/12/03	$\frac{7}{12}$	M.	$17\frac{1}{2}$	I.C.	+	+	U : H.	Lap.	R.	—	R.	Case C.
35.	12/1/04	$1\frac{1}{12}$	M.	50	I.C.	+	+	L.L : L.I.	Lap.	R.	—	R.	Case D.
36.	23/2/04	$\frac{3}{12}$	M.	$36\frac{1}{2}$	I.C.	+	—	E.	Lap.	R.	+	R.	Case E.
37.	7/3/04	$\frac{4}{12}$	M.	$34\frac{1}{2}$	I.C.	+	—	L.H : E.	Lap.	$7\frac{1}{2}$	—	D.	Case F. Moribund on admission.
38.	21/3/04	$2\frac{9}{12}$	M.	$10\frac{1}{2}$	I.C.	+	—	U : R.H.	Lap.	R.	+	R.	Case G. Appendicectomy.
39.	21/4/04	$1\frac{1}{12}$	M.	6	I.C.	+	+	U : R.H : R.L.	Lap.	R.	—	R.	Appendicectomy.
40.	22/4/04	$\frac{6}{12}$	F.	10	I.Colic	+	+	U : R.H.	Lap.	R.	—	R.	
41.	6/5/04	$\frac{6}{12}$	M.	20	I.C.	+	+	L.L : L.I.	Lap.	R.	+	R.	
42.	4/7/04	$\frac{4}{12}$	M.	36	I.C.	+	+	L.L : L.I.	Lap. Res.	12	—	D.	

No.	Date.	Age.	Sex.	Duration. Hrs.	Type.	Passage of Blood.	Palpable per Rectum.	Position of Abdominal Tumour.	Treatment.	Time of Survival. Hours.	Previous Disturbances.	Result.	Remarks.
43.	15/10/04	$\frac{6}{12}$	M.	$7\frac{1}{2}$	C.	+	—	R.I.	Lap.	R.	—	R.	Double colic intussusception.
44.	19/11/04	$\frac{6}{12}$	M.	28	I.C.	+	—	R.L : U.	Lap.	R.	—	R.	
45.	28/12/04	$\frac{6}{12}$	M.	26	I.C.	+	+	L.L : L.I.	Lap.	R.	—	R.	Ventral hernia ensued and was treated successfully by operation.
46.	13/1/05	$\frac{4}{12}$	F.	25	I.C.	+	—	U : R.L.	Lap.	R.	—	R.	
47.	13/2/05	$\frac{7}{12}$	M.	18	I.C.	+	—	L.L.	Lap.	R.	—	R.	Appendicectomy. Sheath here and there was slightly folded on itself.
48.	12/12/04	$\frac{9}{12}$	M.	7	E : I.C.	+	—	U : R.H : R.L.	Lap.	R.	—	R.	
49.	11/2/05	$\frac{1}{12}$	M.	9	E : I.C.	—	—	U : R.H : R.L.	Lap.	R.	—	R.	Same patient as No. 48.
50.	6/3/05	$\frac{7}{12}$	M.	40	I.C.	+	—	R.L.	Lap.	8 Days	—	D.	Obstruction of bowels on 8th day due to an adhesion : operation : death from shock.
51.	15/3/05	$\frac{7}{12}$	F.	20	I.C.	+	+	U.	Lap.	16	—	D.	Intussusceptum reduced through incision in sheath. Mr Scott Carmichael operated.
52.	30/3/05	$\frac{6}{12}$	M.	107	I.C.	+	—	U.	Lap.	R.	—	R.	
53.	4/4/05	$\frac{6}{12}$	F.	32	I.C : C.	+	—	E : U.	Lap.	R.	—	R.	
54.	8/7/05	$\frac{6}{12}$	M.	60	E : I.C.	+	+	U : L.L.	Lap. Colostomy.	12	—	D.	Apex felt just within anus. Colostomy performed because of condition of bowel wall.
55.	25/8/05	$\frac{10}{12}$	F.	20	I.C.	+	—	R.H.	Lap.	R.	+	R.	History of constipation.
56.	19/9/05	$\frac{7}{12}$	M.	6	I.C.	—	—	R.H : U.	Lap.	R.	—	R.	Blood and mucus in motion, passed two days after operation.
57.	10/1/06	$\frac{6}{12}$	M.	5	E : I.C.	+	—	R.H : R.L.	Lap.	R.	+	R.	History of passage of blood at four months.
58.	9/5/06	$\frac{9}{12}$	M.	10	I.C.	+	—	U : E.	Lap.	R.	—	R.	Serous covering split in several places.
59.	13/5/06	$\frac{4}{12}$	F.	42	I.C.	+	+	U : H : L.I.	Lap.	Eight days.	—	D.	Serous coat of cæcum torn and stripped. Death fol-

One point of interest is not brought out by these tables: namely, that most of the patients were healthy, well-nourished infants, and this seems to be the general rule in intussusception. In only 3 cases was there any hint that the child was delicate or ill nourished, and in the great majority it was distinctly stated that he was the very opposite. 74.6% of the cases were in boys, and only 25.4% in girls—too large a preponderance of males to be merely accidental. As regards age, the youngest was an infant of 6 weeks. Only 4 cases were over 2 years. Their ages were $2\frac{6}{12}$, $2\frac{9}{12}$, 3, and 7 years respectively. 6.8% were under 4 months of age; 62.7% between 4 and 7 months inclusive; 20.3% between 8 and 12 months inclusive; 3.4% between 1 and 2 years; and 6.8% over 2 years. The case mortality at the different ages was as follows: Under 4 months, 25%; between 4 and 7 months, 59.4%; between 8 and 12 months, 33.3%; between 1 and 2 years, 100%; and over 2 years, 75%. 62.7% of the cases occurred between October and March. The greater frequency in winter has been attributed to cold, and also to the fact that there are, during these months, numerous festivities at which the youngest member of the family is given rich and indigestible food for the first time in his life, with consequent intestinal irritation. The total recoveries formed 45.7% and the deaths 54.3%. None of the cases in which portions of bowel were resected recovered. These formed 23.7% of the total number. Of the 76.3% in which resection was not performed, 60% recovered. The length of time elapsed between the onset of symptoms and the operation is a matter of great interest. In the recoveries it averaged 21 hours; in the deaths, 39 hours (2 not stated). Of those operated on within 24 hours of the onset, 63.3% recovered; of those done after the first day, 28.5% recovered. The successful case with the longest duration was No. 52 (107 hours). In this case the onset was typically sudden, and there was no history of remission of symptoms throughout the $4\frac{1}{2}$ days of illness.

Of 27 cases that recovered, 10 were operated on within 10 hours.
" " 13 " " 18 "
" " 19 " " 24 "
" " 24 " " 36 "
" " 3 " " after 36 "

Of 31 cases that died, 1 was operated on within 10 hours.
" " 7 were " " 18 "
" " 12 " " " 24 "
" " 16 " " " 36 "
" " 15 " " after 36 "

As stated above, the ileo-cæcal form is by far the most common, 76.3% being of this variety. Of these, 46.6% recovered. The mixed enteric and ileo-cæcal formed 13.6% with 50% recoveries. 5% were enteric and of these none recovered. The colic formed 3.4% with the same number of deaths as recoveries. The ileo-colic numbered 1.7% with no deaths.

I will refer later to the other points noted in these tables.

Symptoms.[1]

The symptoms of acute intussusception are remarkably constant and characteristic. The history of one case differs little from that of another, and as in no other disease is there a similar chain of symptoms we can, as a rule, make a tolerably accurate guess at the nature of the condition present from the history alone. The onset is almost invariably extremely sudden. It is true that the child may have been out of sorts for a day or two; there may have been some diarrhœa, vomiting, or other signs of gastro-intestinal upset. In 42.3% there was a history of such disturbance, more or less immediately antecedent to the onset of symptoms. But even in these cases there is generally an absolutely definite history of a sudden seizure. The mother has no hesitation in stating the exact time at which the illness commenced, and what it was that occurred first. The first symptom in the great majority of cases is pain—sudden severe abdominal pain accompanied by screaming, drawing up of the legs, and kicking. It apparently comes on at any time of the day, and with no particular relation to food. The child may waken screaming from a peaceful sleep, or he may suddenly cry out while being fed or while lying quietly in his cradle. In other cases restlessness, irritability, and peevishness are observed for some hours before the pain begins; and vomiting may sometimes be the first symptom; but it is more than likely that these symptoms accompany the pathological condition which precedes the formation of the invagination, and that in most instances the pain indicates the commencement of the disease itself. Passage of blood by the bowel very rarely occurs before the onset of other definite symptoms. In 46 of the above cases I have found careful notes of the exact mode of onset. In 37 of these it was sudden; in only 9 was it more or less gradual, or at any rate was not of the nature of a sudden violent seizure. In 29 of the 46 severe pain was the first thing noticed. In 9 vomiting was the first symptom. In 6 restlessness or general uneasiness drew attention to the fact that the child was not well

[1] The typical symptoms are very vividly described by John Hunter in his paper on "Introsusception."

before the more severe symptoms appeared. In only 2 did passage of blood precede pain and vomiting, and in one of these severe diarrhœa had been present for some hours before the blood was observed, and it was of small quantity, so that its presence could be accounted for apart altogether from intussusception. A sudden spasm of pain, then, is the commonest mode of commencement, and, generally speaking, intermittent pain continues till the patient becomes moribund. The pain appears to be of a colicky nature, is short in duration, and is followed by a quiet interval, during which the patient is in comparative comfort until the next seizure occurs. The frequency of the attacks varies, and it is difficult to get exact data on this point. In some cases they seem to come every few minutes. In others the baby will be said to have slept uninterruptedly for several hours before being wakened up by another spasm. After a varying period—usually from between 24 to 36 hours but frequently longer—the pain gradually ceases and the patient becomes quiet and drowsy. This often leads the relatives to suppose that the attack is passing off, and that merely exhaustion remains, whereas it is one of the gravest symptoms and usually indicative of paralysis of the gut or commencing gangrene. Vomiting usually comes second in the sequence of symptoms. Almost immediately after the onset of the pain the child vomits violently and repeatedly, and probably soon evacuates all the contents of his stomach. Thereafter only small quantities of yellowish fluid are brought up, or the symptom may cease altogether except when attempts are made to administer food or purgatives. In only one case (No. 8) have I been able to find stercoraceous vomiting noted.

The third and most characteristic symptom is the passage of blood or blood-stained mucus by the bowel. This is practically constant: in only 3 of the 59 cases was it absent. One of these was an enteric intussusception, and another was a mixed enteric and ileo-cæcal. The latter was operated on very promptly, as it was the second time that the patient had suffered from the condition (No. 49). On the first occasion blood was passed, and it probably would have been on the second had relief not been obtained so soon. The third was an ileo-cæcal case (No. 56) operated on very promptly: blood was passed two days after operation. The passage of blood frequently occurs at the same time as an attack of pain, and is often accompanied by a good deal of straining. Blood does not usually appear until after the first 4 or 5 hours, but the time of onset of this symptom varies within wide limits, according doubtless to the position and state of congestion of the tumour.

In most cases there is some diarrhœa before absolute con-

stipation sets in as a result of the obstruction caused by the tumour. The diarrhœa is due to the violent peristalsis set up by the intussusception. The bowel below empties itself, and there is probably also a good deal of fæcal matter passed along the lumen of the intussusception in the very early stages before occlusion takes place. After this preliminary diarrhœa, which may consist of one large motion or several small ones, nothing is as a rule passed but small quantities of mucus and blood. In case No. 46—a typical ileo-cæcal invagination with marked congestion—a normal motion was passed about half an hour before operation. I can offer no satisfactory explanation of this phenomenon, but such an occurrence would be very misleading in a case in which diagnosis was doubtful. Fortunately it is very rare.

Usually the child refuses the breast, and will not take anything by the mouth. Sometimes, however, the natural instinct seems to be too strong, and he will suck as often as he is allowed —only to vomit immediately after swallowing.

Lastly, one should note that the general condition of the patient rapidly becomes a very serious one. Collapse appears in some cases alarmingly early, and is soon followed by a sinking into a moribund condition. In this connection it is of great value to ask the mother her opinion of the baby's condition. Infants vary so much in their appearance, facial expression, and general attitude that it is often difficult to estimate accurately the extent of the collapse; but the mother, who knows so well what the child's demeanour is in health, will usually be found to be correct if she states that he is "very ill" or "awfully felled."

Physical Signs.

The physical examination of a patient suffering from severe colic, vomiting, etc., must always be performed with the very greatest care, for a superficial inspection might easily result in an early intussusception being overlooked.

In most cases the child is quiet, perhaps sleeping, and when roused does not cry, or if he does the cry is weak and unnatural. At intervals he may scream and draw up his legs. The general appearance is misleading to one who has not made a study of infants. A casual observer might think that there was little the matter. But on more careful examination this very quietness is seen to be due to a more or less serious state of collapse. I have gone through the 59 cases in the Children's Hospital, and noted the varying degrees of collapse in the different patients on

admission. In 29 only a slight amount was present; of these, 17 recovered and 12 died. In 24 the collapse was fairly severe; of these, 11 recovered and 13 died. And in 6 the patient was extremely collapsed; of these, 1 recovered and 5 died.

The complexion is generally pale, perhaps of a somewhat earthy tint, and the face is drawn, particularly round the mouth. The eyes are sunken, and in bad cases dull and expressionless. Depression of the fontanelle is only present in severe and advanced cases. The respirations are a little quickened and the pulse rapid. The state of the temperature depends on the stage that has been reached. Within the first 24 to 36 hours it will usually be subnormal or normal, as one would expect in association with collapse. Later, when gangrene and inflammatory mischief set in, it is usual for the temperature to rise 2 or 3 degrees. In infants the temperature is subject to large and rapid fluctuations from slight causes, and here, as in other diseases, one cannot draw accurate conclusions from this sign alone. Of the 59 cases, 4 had a temperature on admission of over 102° and they all died. Three of them had a history of over two days' duration; the fourth had only existed for 15 hours, but the tumour was intensely congested and quite irreducible. 22 had a temperature between 100° and 102°; 9 of these recovered and 13 died, and of the latter 7 cases were irreducible or gangrenous. In 29 the temperature was between 98° and 100°, of which 16 recovered and 13 died. The 4 remaining were below 98° and two of them recovered.

The abdomen in most cases is only moderately distended, and moves freely with respiration. Great distension, tenseness, and rigidity are hardly ever seen. A certain degree of asymmetry may be visible. For example, the left side of the abdomen may be full, with a corresponding depression on the right side. Lastly, a definite elongated tumour may be visible in one or other region of the abdomen.

Palpation often causes great pain, with consequent rigidity of the abdominal wall, and on this account chloroform may have to be administered before the presence or absence of a tumour can be made quite certain. When the tumour is felt it can be made out to be firm, cylindrical and elongated, with varying degrees of size and mobility. Usually it is slightly curved in its long axis, and this renders the term "sausage shaped" peculiarly applicable.

The position of the tumour is a point of some interest. In 57 of the 59 cases the position was definitely stated. In 5 it was in the upper part of the abdomen, in 24 on the right side, and in 28 on the left side. Taking the different varieties separately the positions were as follows:—

	Right.	Left.	Top.
Ileo-cæcal	14	26	4
Enteric	3	0	0
Mixed	6	0	1
Colic	1	1	0
Ileo-colic	1	0	0

The positions in the ileo-cæcal cases that recovered and those that died are worth mentioning, because the situation of the tumour indicates the length that it has travelled. Of the 21 that recovered, 11 were on the right or upper part of the abdomen and 10 on the left side. Of the 24 that died, 5 were on the right or upper part, 18 on the left, and 1 was not stated.

The "signe de Dance," or emptiness of the right iliac region, in ileo-cæcal intussusceptions is certainly unreliable, and may be absent; but it is not, as is frequently stated, entirely the product of powerful imagination on the part of those who would make fact fit theory. In 3 of my 7 cases it was quite definitely present, and I noted it in my first case without knowing that it was a sign to be looked for, and without having thought of the position of the invagination.

Lastly, on examining the rectum, the apex of the intussusceptum can often be felt in cases where the tumour has travelled far enough; and in others the tumour can sometimes be palpated through the wall of the bowel. Out of 55 cases in which an examination was made, the tumour was palpable per rectum in 29, and not in 26. As regards the character of the apex, when it is felt it is probable that here invagination plays a very large part. From text-book descriptions one would gather that the "os uteri" form was almost invariable—a rounded projection in the lumen of the bowel with a dimple in the centre corresponding to the ileo-cæcal valve. Personally I have never been able to satisfy myself that I felt anything more than a simple rounded projection; and the actual position of the ileo-cæcal valve, as I have described it above, confirms my belief that only very rarely, if at all, could one palpate the opening per rectum. The examining finger, on being withdrawn, is frequently seen to be covered with blood. Occasionally the intussusceptum may actually protrude from the anus. When this occurs, there is generally a great deal of tenesmus. In none of the 59 cases was this sign present, but in one (No. 54) it was just within the anus. Wiggin[1] found it in 5 per cent. of his 103 cases.

[1] *Lancet*, Aug. 28th, 1897.

Diagnosis.

The diagnosis of acute intussusception is, in the majority of cases, comparatively simple, but in spite of this it is a frequent experience in hospital to have cases sent in too late, either with no diagnosis at all, or with a statement to the effect that treatment for colic having been employed with only temporary benefit, intussusception was feared. Of late years more attention has been drawn to the condition as occurring in infants, and a steadily increasing number of cases is recorded as time goes on. This is probably due to the fact that fewer cases are missed, and not to any increase in the prevalence of the disease. Sudden severe pain in the abdomen, soon followed by vomiting, especially occurring in a child about six months old, should at once raise the question of intussusception in our minds; and it should only be excluded after the most careful abdominal examination. Passage of blood by the bowel makes the diagnosis almost certain if associated with the other symptoms, but we need not wait for the occurrence of this before making up our minds. The general state of the patient gives valuable help, and we can judge of this better if we have full knowledge of the child's previous condition, for which reason the family doctor can in most cases greatly assist the surgeon by giving his opinion on this point. All doubt is removed when the projecting apex can be felt per rectum. Should the condition be overlooked and palliative treatment resorted to, the child's fate is in all probability sealed, and one cannot emphasise too strongly the importance of early diagnosis. If there is the slightest uncertainty—and considerable doubt must often exist, particularly in the early stages—an examination under chloroform should be made at once. Before collapse has set in the infant will probably strongly resent abdominal palpation; and, as we usually have to deal with healthy, well-developed babies, it may be impossible to exclude the presence of an abdominal tumour on account of the voluntary fixation of the muscles. A good plan is to place the flat of the hand quietly but firmly on the abdomen and wait for the termination of a fit of crying, when the muscles will be suddenly relaxed, allowing of a thorough if very brief examination. If still no tumour can be felt, chloroform should be given without hesitation. Infants take chloroform well; they go under with a small dose; and as only a momentary anæsthesia is required, no bad effect is likely to result. In 2 of my 7 cases I was not able to feel a tumour at all until the anæsthetic had been given. One must not forget while examining the abdomen that the intussusception may be small and deeply situated, and that even under chloroform its detec-

tion is often difficult, especially when it is placed deeply in the iliac region or in the hypogastric region under cover of the liver. A free rectal examination should be made at the same time, for this causes a good deal of pain when performed without an anæsthetic, and the straining renders difficult an exact localisation of what is felt. The differential diagnosis is chiefly concerned with those diseases associated with the passage of blood by the bowel. (1) A severe ileo-colitis with diarrhœa and tenesmus may cause blood and mucus to appear in the stools. Apart from the history of a sudden onset with severe pain and the presence of an abdominal tumour, there is vomiting and a normal or subnormal temperature in intussusception, while in ileo-colitis the temperature is high and vomiting usually absent. (2) Any form of diarrhœa, especially if there is ulceration of the bowel, may be associated with blood in the motions, but here the history and general condition are entirely different. In the ordinary diarrhœa of infants there is usually bile in the motions, and this is never found in intussusception. (3) Rectal polypus usually causes more copious bleeding than does intussusception; and an examination of the abdomen and rectum clear up the diagnosis. An infant was sent to the Children's Hospital last winter suffering from tenesmus and passage of blood, with a diagnosis of intussusception. On careful examination no tumour could be found, and the removal of a rectal polypus with a pair of dressing forceps resulted in instant relief. (4) Congenital obliteration of the bile ducts, or serious organic disease of the liver, may lead to the discharge of blood from the bowel; but these conditions are hardly likely to be mistaken for intussusception. (5) Cases of purpura hæmorrhagica have sometimes been diagnosed and treated as intussusception, probably because the passage of blood has been so much emphasised as a symptom of the latter to the neglect of the more important signs and symptoms.

Course and Prognosis.

When an acute intussusception has formed its course depends principally on the tightness with which the bowel is nipped and the acuteness of the congestion. In what are termed the ultra-acute cases the child dies within 24 hours—sometimes as soon as 10 hours after the onset. Others live for 48 hours or three days with acute symptoms. In a few cases in which the course is not so exceedingly acute the patient may survive for several days. Among some cases collected by Lawford Knaggs[1] is one recorded by Marsh of a male child,

[1] *Lancet*, April 24th, 1897.

aged 7 months, who was operated on successfully after 14 days. The symptoms had been acute for the first 12 hours, and then had become more or less chronic. This is quite an isolated case. In the vast majority of cases in infants the process is essentially acute, and those that survive beyond the third or fourth day must be looked upon as exceptions.

The question of spontaneous recovery is one of very little importance in connection with the infantile type. Recovery may very occasionally occur from spontaneous reduction of the tumour, and then as a rule when an anæsthetic has been administered. In case 4 a completely reduced ileo-cæcal intussusception was found when laparotomy was performed, and in case G the tumour had greatly diminished in size, so much so that the surgeon was unable to feel it before he opened the abdomen, although it had been quite definitely palpated half an hour previously.

Still more uncommon in infants is the passage of a slough consisting of the intussusceptum. It did not occur in any of the 59 cases. Wiggin [1] found one example in 103 cases, a male infant, aged 7 months, who passed a slough on the fourth day and recovered. (Wiggin's statistics as regards age, sex, etc., are practically identical with mine. He had, however, a larger proportion of the ileo-cæcal variety—89%.) The process in infants is too acute, and the resulting collapse and obstruction come on too soon to allow of the slow processes of cicatrisation which must accompany the separation of a slough if it is not to be followed by peritonitis. Wiggin estimates that 98% of cases, if left to nature, will die from the immediate or remote effects. Spontaneous recovery, then, must never be expected or reckoned on. The prognosis is of the very gravest once a diagnosis has been definitely established, and for practical purposes we may say that the infant will be dead in a matter of hours, or at most days, unless prompt treatment is resorted to.

Treatment.

The treatment of intussusception has for centuries been a matter of continual dispute, and, although within recent years the question has been thrashed out from every point of view, differences of opinion still exist, and the dispute is only slowly showing signs of settlement. I do not intend to discuss the treatment by manipulation and massage of the tumour through the abdominal wall, as these procedures are acknowledged by every one who has a right to express an opinion to be not only useless but absolutely dangerous. Anyone who has examined a

[1] *Lancet*, August 28th, 1897.

case carefully will know the difficulty of ascertaining the exact relations and attitude of the tumour, and, therefore, of deciding how to commence and in what direction to continue the manipulation The practice is obviously unscientific, and may be condemned without further comment.

Two distinct methods of treatment are employed. First, the injection of air or water into the bowel, and, second, reduction by manipulation after laparotomy. As the first method has still numerous supporters, it will be necessary to carefully consider the respective merits of the two procedures. I would say at once that in my opinion immediate laparotomy in every case is the only line of treatment likely to yield any manner of success over a large number of cases. Several writers indicate that such will probably soon be the recognised form of treatment, and many surgeons now recommend it, but in no text-book of surgery or children's diseases have I found prompt surgical treatment absolutely insisted upon. All countenance at least a trial of the distension procedures. It is interesting to note in looking through these books that closer and closer limits are being set as to the time during which mechanical treatment is justifiable. Eustace Smith [1] thinks that they should not be relied upon after the fourth day of the disease. Keen [2] fixes a limit of 48 hours; D'Arcy Power [3] recommends their use up to 48 hours. John Thomson [4] states that they are "frequently successful in reducing intussusception if it is of recent occurrence." Treves [5] points out the great disadvantages of this treatment, but permits it within 12 hours of the onset. Cheyne and Burghard [6] recommend a combined laparotomy and injection in the early stages. Ashby and Wright [7] fix no limit, but indicate that surgical opinion leans to abdominal section in all cases. Koplik [8] allows enemata once, at once, if at all; Holt [9] restricts their use to the first three hours. The old method, then, dies hard. The most recent publications still give it an honoured position, but exclude it politely by putting limits to its use which place it outside the range of practical treatment. What are the points in its favour? We are told that it raises little parental opposition. This cannot be contradicted, but surely no one could consider such a reason sufficient

[1] "Disease in Children," 1884.
[2] Keating, "Cyclopædia of Diseases of Children," 1890.
[3] *Edinburgh Medical Journal*, June 1897.
[4] "Clinical Examination and Treatment of Sick Children," 1898.
[5] "Intestinal Obstruction," 1899.
[6] "Surgical Treatment," 1902.
[7] "Diseases of Children," 1899.
[8] "Diseases of Infancy and Childhood," 1903.
[9] "Diseases of Infancy and Childhood," 1903.

excuse for persevering in bad treatment. Secondly, the means for its performance are always at hand, which is certainly true; and it must be admitted that in a remote district where much time must necessarily elapse before surgical aid can be procured, these methods might quite fairly be employed in the early stages. But this reason can only apply to a small percentage of the cases, and it in no way affects the main line of argument. Thirdly, infants are said to stand operative procedures very badly. This is most certainly an ill-founded superstition. The same argument was advanced against the radical cure of hernia in infants, and yet an Edinburgh surgeon has recently operated on 200 such cases in succession without a single death. A reference to cases C and D will prove that the mere laparotomy has very much less effect in children than in adults. Death results not from the operation but from the delay that preceded it. Lastly, the possibility of ventral hernia following laparotomy has been pointed out. This is very rare, as the above statistics show, and is easily cured when it does occur. In any case a hernia is a small matter compared with the life of the individual. Apart from actual results there are several theoretical objections to this line of treatment. (1) We can neither see what we are doing nor can we know when to stop. We cannot be sure that the intussusception has been reduced, for, on the one hand, a thickening of the bowel consequent upon the invagination may be mistaken for an unreduced tumour, and the treatment kept up a needlessly long time and with dangerous force; and, on the other, the last inch or so of the invagination (the most difficult part to reduce) may entirely escape detection, and we will then stop too soon. (2) One can never tell beforehand that any particular case is suited to this procedure. It may entirely fail in what appears to be a most favourable case. Further, we cannot know what is the state of the gut which we propose to submit to strain. It may be friable, in a state verging on gangrene, and unable to withstand even slight distension. (3) In those cases in which it fails not only is valuable time lost, but the patient's condition is rendered very much worse, and the prospects of a successful laparotomy greatly diminished. The tumour may be to all appearances gone, but if it is not, the combined effects of the anæsthetic, of opium (which is always recommended), and of shock from the distension, retard the reappearance of definite symptoms for several hours. Were it possible to employ these measures unsuccessfully without prejudicing the chances of the patient, one of the chief objections to their use would be removed, but this is very far from being the case. Numerous cases are on record of repeated recurrences after treatment by injection. It is

certain that most of these have not been recurrences at all, but simply renewed growths of a tumour which has never been completely reduced. (4) They are absolutely useless in the enteric forms, because fluids cannot pass the ileo-cæcal valve, and probably also in the ileo-colic, because of the tight grip that the valve takes of the ileum. (5) True recurrence seems to be more common after reduction in this way than after operative measures. D'Arcy Power thinks that this is probably due to the dilatation of the colon produced by the distending agent.

To come to a more practical question, let us consider what, if any, are the dangers of this mode of treatment apart from the loss of time. It must be left to the advocates of the method to decide whether inflation or irrigation of the bowel is to be adopted. Inflation by air or gases still finds some supporters, and much ingenuity has been manifested in multiplying the means by which it can be carried out. Air may be introduced by means of an ordinary bellows, a Higginson's Syringe, or a Lund's Insufflator—an instrument fitted with an indiarubber collar to prevent the return of gas alongside of the rectal tube. Carbonic acid gas has been used, and it can be generated inside the bowel by introducing separately soda bicarbonate and citric or tartaric acid in solution, or outside the body in some closed receptacle. For the latter purpose Lundie has introduced a special modification of the domestic gasogene with a rectal tube attached. Senn, who carried out numerous experiments on this subject, recommended hydrogen. It has even been recommended that the rectum should be plugged to allow of the accumulation of intestinal gases. Gases are alleged to have an advantage over fluids in being capable of passing the ileo-cæcal valve and reducing an enteric intussusception. No successful case, however, has been recorded, and our knowledge of the pathology of acute enteric invaginations makes us doubt very much if one ever will be. Irrigation has now almost entirely superseded inflation for the purpose of distension. Water is more easily controlled than gas, and its amount and force can be more accurately estimated. It is introduced by means of a rectal tube, the required force being obtained by holding the filler a certain height above the bed. As the result of experimental work, very definite limits have been set as to the head of water to be employed. Such restrictions will certainly minimise the direct dangers of the method and diminish the number of accidents. It is now usually stated that the water should be introduced slowly, in a steady stream, and from a height not exceeding three feet. Formerly much greater force was permitted. Rotch[1] recommends a head of $6\frac{2}{3}$ feet accompanied

[1] Hygienic and Medical Treatment of Children.

by massage of the abdomen. An American writer advised that the child should be placed in the hall and the water poured down a tube from the first landing! The amount of fluid to be introduced apparently has to be roughly estimated from the age of the patient. D'Arcy Power[1] found the capacity of the colon at different ages to be a very uncertain quantity. Between five and nine months it varies from 10 to 16 ounces.

The experiments of Mortimer[2] on the bodies of children are of interest in connection with treatment by irrigation. This method was to open the abdomen, ligature the ileum, and then close the abdomen before introducing the fluid per rectum. He pointed out that when the abdominal wall is flaccid, as is usually the case when a child is under chloroform, the whole distending force of the water would act on the bowel wall. If during introduction any kink occurred in the colon, the whole distending force would act on the bowel wall below the kink and the colon would very readily rupture. The same effect would be produced during life by a sudden contraction of any portion of the bowel. Out of 21 cases, Mortimer found that in only 2 could the water be raised to 11 feet without some damage to the bowel resulting. In many cases peritoneal cracks occurred when the height was only 5 feet (equivalent to 2½ lbs. to the square inch). In the majority a head of 8 feet caused similar damage, and in some 6 feet was sufficient to completely rupture the bowel. He noticed that rupture was most likely to occur at the splenic flexure or transverse colon. Mole[3] arrived at practically the same results by experiments performed with the abdomen open. He observed that complete rupture was usually preceded by a longitudinal splitting of the serous coat. When applied to actual practice these results lose a good deal of their value, because the experiments were performed on dead bodies and on intestines that were in no way diseased. A pressure of 2½ lbs. to the square inch or even more may be applied to a healthy bowel wall without immediate risk, but how are we to know that in any given patient the gut may not be, as is often found at operation, so friable from congestion and pressure that the slightest pressure would tear it like paper? Again, if an ileo-cæcal intussusception has travelled round to the splenic flexure and consequently diminished the capacity of the colon, what fraction of the amount of fluid that the healthy colon would accommodate are we to introduce? Records show that even when the greatest caution is employed rupture may occur —and this is just exactly what we would expect.

[1] *Edinburgh Medical Journal*, June 1897.
[2] *Lancet*, May 23rd, 1891. [3] *Bristol Med.-Chir. Journal*, 1894.

Lawford Knaggs collected 7 cases in which rupture of the bowel from the introduction of air or water had caused death. In one of them laparotomy was performed after the rupture had occurred, and it was found that the intussusception could be reduced with the greatest ease. These cases were all published by men whose reputation was great enough to enable them to do so without fear of disgrace; and the very fact that such accidents have occurred in the hands of skilled surgeons indicates clearly that very many more must have taken place under less experienced practitioners. We are told to let the distending force continue acting until a "giving way" occurs and the area of the abdomen occupied by the colon becomes distended. But this "giving way" and distension are exactly the signs that follow rupture of the bowel. If we then administer opium and put the patient back to bed, the condition will be hopeless by the time the accident becomes apparent. As mentioned above, reduction may appear to have been accomplished, and yet an inch or so of invaginated bowel is left to restart the process and leave the condition worse than before with several valuable hours lost. Lastly, a bad tear of the bowel short of complete rupture, or a small leak, may escape detection, and lay the foundation of a rapid and fatal peritonitis. Taking everything into consideration, it would appear that the only safe thing to do in the interests of the patient is to open the abdomen immediately after the performance of irrigation to make sure that everything is right, or to follow the plan recommended by Cheyne and Binghard and perform the irrigation with the abdomen open. If so, why not avoid the risks and bother of these clumsy procedures altogether?

The advantages of immediate laparotomy are obvious, if it is granted that irrigation is at the best uncertain and at the worst dangerous. The condition of the tumour and its relations are seen. The intussusception, if reducible, is unfolded by gentle pressure from below, acting through the sheath, without injury to the bowel; if irreducible, the position is at any rate better than if enemata were being employed, and resection of the involved bowel can be proceeded with—a forlorn hope, certainly, but still the only rational treatment. A gangrenous appendix can be removed, as was done in case No. 50. Tendency to recurrence can be diminished by fixing the terminal portion of the ileum by stitches through its mesentery, so as to make it descend towards the cæcum. In an uncomplicated case the whole operation need not occupy more than twenty minutes. By careful manipulation many cases can be reduced which it would have been quite hopeless to attack by distension; but if good results are to be obtained from laparotomy,

all cases must be subjected to it as soon as a diagnosis is made. The patient's chances must not be prejudiced by wasted time and increased shock caused by other procedures. Laparotomy must not be regarded as a dread last resource; if it is, the results will most certainly fulfil the anticipation. And if a case is absolutely hopeless and bound to succumb, no matter what treatment is employed, laparotomy may be done as the only possible line of treatment indicated; but such cases must not be included in statistics used to contrast the advantages of the two methods.

Statistics are notoriously misleading, but in this disease, I regret to say, they are entirely unreliable. Were it not so, I have no doubt that actual results would make out an overwhelmingly strong case for laparotomy. I think that in intussusception particularly there is a tendency to record successful cases, not unsuccessful ones; because in the practice of most surgeons the cases are uncommon, and when death occurs there is generally no special feature is the case that is considered worthy of publication. Again, many of the cases have been subjected to both methods of treatment, and this further complicates matters. To draw conclusions of any value from statistics, one would require to have two extended series of cases: one series treated by irrigation, and the unsuccessful cases which afterwards succumbed to operation counted as deaths; and the other series treated by laparotomy, and not to include cases which had previously been failures under irrigation, and which died after operation. Such an arrangement would, if anything, give the advantage to the first series, which would take no note of cases which were cured by laparotomy after having been treated by mechanical means without result. Information of this kind is not obtainable. In recording an operation case, writers rarely state whether or no other procedures were first tried. Cases coming to hospital usually have a history that the doctor gave an enema, but whether this was before a diagnosis was come to and was meant to relieve the bowels, or was introduced for the purpose of reduction of an intussusception, is a difficult and delicate question to elucidate. Then a considerable proportion of cases are sent for treatment when it is too late to save them by any method, and although laparotomy is of course performed, these cases, which could never have increased the number of recoveries from irrigation, simply serve to swell the number of deaths from operation. As will be seen from the above tables, every patient who was subjected to resection of the bowel died, but these cases would just as certainly have been lost had they been left alone or treated in any other way. If an intussusception is reduced easily by

operation and afterwards dies, it may quite fairly be asserted that the patient might have been saved by injection, but under no other circumstances must this contention be raised.

Of the above 59 cases, 45½ per cent. recovered. In 1896 Wiggin[1] collected 39 cases treated by enemata or inflation, with 41 per cent. of recoveries. It is impossible to correct these figures as I have suggested above, but if cases which required resection, and were therefore incurable by any other means, are excluded from my lists, the recovery rate rises to 60 per cent. Wiggin also collected 64 cases treated by laparotomy, and of these 32.8 per cent. recovered, and with resection cases excluded, 47.6 per cent. If one could exclude from the operation mortalities cases that had already been unsuccessfully treated by other means, these figures, satisfactory as they are, would undoubtedly be greatly improved. Wiggin points out that the results from laparotomy had greatly improved in the seven years immediately preceding publication, during which period over 77 per cent. of the patients subjected to simple laparotomy and reduction had recovered. The same progressive improvement is to be noted in my tables. The last twenty-eight operations show only six deaths, one a resection case and the others all cases of great difficulty. Cuthbert Wallace,[2] at a recent meeting of the Clinical Society of London, gave particulars of twenty operation cases, with 80 per cent. of recoveries over all, and 89 per cent. when resection cases were not included. At the same meeting, C. H. Fagge[2] detailed eighteen cases treated by laparotomy, with 61 per cent. successful, and 84 per cent. recoveries in reducible cases. Clubbe[3] reported 100 consecutive cases with 63 recoveries. Bernard Pitts[4] was able to publish 7 consecutive laparotomies for intussusception with only one death. No good end can be served by multiplying incomplete statistics. In any small collections of cases that I have come across, a 41 per cent. of recoveries by mechanical methods was never exceeded, and most of the operation publications consisted of one or two successful cases, and were therefore useless. It will thus be seen that, even with the great disadvantages that the surgical treatment of this disease has to face from delay and employment of other methods, the actual results from laparotomy are far in advance of those from injections. In recent years, owing doubtless to the fact that the medical profession generally is becoming alive to the urgency of the condition and the necessity of prompt treatment, extremely favourable results have been obtained in what used to be looked upon as one of the most deadly diseases of infancy. When we remember

[1] *Op. cit.* [2] *British Medical Journal*, December 17th, 1904.
[3] *British Medical Journal*, January 17th, 1905. [4] *Lancet*, June 12th, 1897.

that intussusception occurs most commonly in healthy male children—those, that is to say, of greatest future value to the state—we must admit that the question is one requiring the most serious and unprejudiced consideration. I hope I have shown that immediate operation is the treatment that not only commends itself to reason, but gives by far the best results. It is monstrous that, because an occasional case can be cured by injections, hundreds of children should die every year from intussusception; and one may fairly call it a calamity that even one case should ever have recovered by these means.

The details of the operation for a simple reduction are so simple that I need not describe them at any length. The abdomen is best opened in the middle line above the umbilicus in most cases, but the incision must vary according to the position of the tumour. An opening of from 2½ to 3 inches usually gives abundance of room. The tumour should be brought into the wound if possible. There is no advantage in attempting to reduce it as it lies. Reduction is to be accomplished by expression of the intussusceptum from below by pressure applied through the sheath. Traction on the entering tube is never to be used. Great care will frequently be required in dealing with the last inch or so, especially in ileo-cæcal cases, because it is when almost the whole mass has been reduced that the most congested portion, namely, the apex, has to be dealt with. Gentle patient manipulation is to be persevered with. A very helpful procedure is to envelop the mass in a swab and compress it steadily for about a couple of minutes—just as is done with the glans penis in a case of paraphimosis. This diminishes the congestion and swelling, and often enables reduction to be accomplished with surprising facility. Sometimes splitting of the serous coat of the sheath may occur. The tears should be closed with fine silk sutures. They are not necessarily of grave significance (see case 58). If the ileum lies in a position of ascent towards the colon, and recurrence is feared, the mesentery should be united to the ascending meso-colon by catgut sutures so as to hitch up the terminal portion of the ileum and make it descend to the ileo-cæcal junction. The reason for this is fully described above. Some surgeons prefer to simply shorten the mesentery by folding it on itself.

When the tumour is irreducible, the outlook is practically hopeless. The following are the procedures that have been employed: (1) An artificial anus may be made above, or a lateral anastomosis established between the bowel above and that below the intussusception, the tumour being left inside the abdominal cavity. It is difficult to conceive how any but uniformly fatal results could be expected from such measures.

(2) The whole intussusception may be excised and the divided ends of bowel fixed in the wound to form an artificial anus. There is no record of a successful case in an infant from this method. (3) After excision of the intussusception an end-to-end suture of the divided ends may be performed either with silk stitches alone or with the aid of a button. This is probably the correct treatment, but as all methods have been attended with such a fearful death-rate in infants it is difficult to compare results. Clubbe[1] recorded a successful case in a child of eleven months. Jacob Frank reported another of nine months at the Chicago Surgical Society in November 1904. (4) A hole may be made in the sheath and the intussusceptum excised, as was recommended by Barker.[2] This method has the advantage that occasionally it is found possible to complete reduction after the sheath has been opened, in which case, of course, the hole made is simply stitched up again. The first step, then, is to make a longitudinal incision in the intussuscipiens along the part furthest from the mesentery. If reduction is still impossible, the entering tube and the sheath are united by a continuous silk suture all round the neck on the outside. The intussusceptum is then drawn out of the opening in the sheath and amputated as high up as possible. In doing this, both the inner and middle layers of bowel are divided. A small portion of the circumference is cut at a time and the two layers firmly united with a silk suture. Another portion is then treated similarly, and so on until the whole ring has been divided and sutured. The intussusceptum is then removed entirely, and the incision in the sheath closed. This proceeding suggested itself to Barker after he had amputated a colic intussusception that was protruding from the anus[3] by the same steps as I have described above, except, of course, that no incision was required. This operation has many points in its favour, and in a suitable case should most certainly be employed. In infants, however, the irreducible portion is, as a rule, so extremely short that the operation would be difficult to carry out. Resection with end-to-end suture would not involve much sacrifice of bowel wall under such circumstances, and would probably be preferable on the whole. Israel[4] has modified Barker's procedure with good results. He stitches the colon forming the sheath to the parietal peritoneum before incising the bowel. The subsequent steps are similar to those of Barker, except that the opening in the sheath is not at once closed but is left for a short time as an artificial anus.

[1] *British Medical Journal*, November 6th, 1897.
[2] *Lancet*, January 9th, 1892.
[3] *Med.-Chir. Transactions*, vol. lxx.
[4] *Medical Record*, May 10th, 1905.

When the whole tumour is gangrenous, resection with end-to-end suture must be undertaken as a forlorn hope. If the condition of the patient is so bad as to forbid even this, the gangrenous mass should simply be fixed outside the abdominal wall in the hope that, if the patient survives, an artificial anus may form and the tumour slough away.

In a simple case, the abdominal wound may usually be closed completely. If any part of the bowel wall is suspicious in appearance a small gauze drain should be inserted down to it and left in for two or three days. The best way to close the abdominal wall is by means of silkworm gut sutures, through all layers, and threaded externally through short pieces of rubber tubing to prevent them cutting the skin, which they are very apt to do in infants if left unprotected.

After the operation the patient must be surrounded with hot bottles and all means employed that will be likely to lessen the shock if it is severe. The use of opium has been almost universally recommended. It is to be given as soon as the condition is diagnosed, after enemata and inflations, after operations —in fact at all times and stages, because it quiets the bowel and retards the formation of invagination. Now, the real danger and anxiety after operation arise not from the possibility of recurrence, but from the effects of the obstruction, and paralysis and distension of the affected bowel. Opium of all drugs will tend to increase this and therefore to intensify the toxæmia arising from obstruction. A mild purge is therefore more strongly indicated. Before operation opium is indicated, when a clear diagnosis has been come to, in order to allay the suffering during the time that must elapse before the operation can be done, and to prevent increase in the size and congestion of the tumour. The best purgative to give is, I think, calomel. It combines the advantages of a peristaltic stimulant and an intestinal antiseptic. It should be given in small doses frequently, and may be started almost at once if there is no sickness. When there is much distension and nothing is being passed by the bowel, I have found strychnine in full doses hypodermically to be very beneficial. Physostigmine has given good results under similar circumstances after abdominal operations on older children, but I have never ventured to try it on infants. The main object of treatment after reduction is to get the bowels to move, and sedatives will certainly increase the paralytic distension, although they may allay symptoms and hide the gravity of the patient's condition.

Diluted milk by the mouth in small quantities may be started at once if the child seems hungry, and in any case in an hour or two if there is no sickness. If vomiting is trouble-

some, salines per rectum or subcutaneously must be given until feeding by the mouth can be commenced.

As regards stimulants, I am convinced that they are most injurious. Many an infant whose life hangs in the balance has the scale turned against him by the injudicious use of strophanthin, digitalin, and strychnine. Every authority on diseases of children emphasises the fact that infants tolerate these drugs very badly even in health; and yet, after abdominal operations, the notes show that they are generally all given and in almost lethal doses, apparently with the idea that if they do no good they can do no harm. Any child who survives the initial shock of an operation for intussusception will show a marked stage of reaction during the first few hours, whether stimulants are given or not. The subnormal temperature rises to perhaps 102° or 103°; the small, almost imperceptible pulse becomes full and rapid; the pallid damp cold skin becomes flushed, dry, and hot. If stimulants are being used, all this is attributed to them, whereas they are simply overdriving a heart that is already doing all that is necessary, and overstimulating an already active nervous system, with the result that when the reaction begins to decline the child dies of exhaustion and toxæmia. Digitalin and strophanthin should be excluded altogether and strychnine only given with caution. The best method of tiding the patient over the initial shock, and if necessary maintaining his strength, is by means of saline infusions, saline by the rectum, and, if necessary, small doses of alcohol. The vomiting and starvation preceding operation must diminish the body's supply of fluid, and for this reason there is an additional advantage in the use of saline. Cases that are done early usually require no after treatment at all. The child's hungry cry soon demands food, and I have never seen any harm result from gratifying his desires. It is not necessary to keep the baby long on his back. The stitches may be taken out on the ninth or tenth day, and a couple of days later the patient can be discharged if all is well.

I wish to acknowledge my indebtedness to Mr Stiles for the use of the above cases, and for much kind advice and encouragement in the preparation of the paper. My thanks are due also to Mr E. Scott Carmichael, Assistant-Surgeon, and to his predecessor, Mr George Chiene, who have permitted me to include cases operated on by them.

INTUSSUSCEPTION STATISTICS AND THEIR STORY

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Showing the influences of age, duration of symptoms, and variety of operation; also the causes of death, together with some remarks on surgical procedures, and suggestions as to the line of progress in the treatment of this disease.

INTUSSUSCEPTION has always been classed under the heading of "Intestinal Obstruction," and discussed as one of the causes. It is still so placed in the text books. Its position is similar to that accorded to appendicitis, in the earlier days, when it was classed with peritonitis as a factor in the causation. Therein lies the cause of much of the mortality of intussusception. When it only occurs to a practitioner as a probable cause of the obstruction from which his patient suffers, the opportunity for successful treatment, in the great majority of cases, has passed.

The time has come when intussusception must be regarded as a condition having definite symptoms and signs, capable of being diagnosed in the early stages, and requiring surgical treatment at the earliest possible moment. The pathologist has always been interested, and has carefully mounted his specimens and given them a prominent place in his museum. The surgeon has keenly treated such cases as were sent to him, and has exhibited his successes with pardonable pride, for the material was in most cases unpromising. The general practitioner should be as keen and alert as either of these. The responsibility of early recognition rests with him, and, as the element of time is probably the most important factor in the determination of success or failure, that trust is no light burden.

This insistence on early recognition and treatment of intussusception is amply supported by the records of cases and results. In the adjoining tables the salient features of 123 cases are classified. These records contain all the cases of

intussusception treated in the Glasgow Royal Infirmary and the Hospital for Sick Children since 1893.

The first table comprises those which occurred during the 10 years between 1893 and 1903; the second table deals with the cases during the last three years, from April 1903 to April 1906. The contrast between these two records is very interesting, and in some respects gratifying. The total number of cases sent into hospital for treatment was 64 and 59 respectively, so that almost as many were treated during the last three years as during the previous ten years. This increase has not been so sudden as that statement seems to imply, for, when the total numbers for each year are compared, the increase is seen to be gradual, although the rise is more marked in the recent years.

1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906 4 mos.	Total
2	3	0	1	4	4	8	6	12	12	16	22	20	13	= 123

It is possible that a number of factors may combine to produce this increase, but the most important of these is, apparently, the greater attention given to, and the more frequent recognition of, this disease; for it will hardly be maintained that the increase of the population, an alteration in the dietary of the classes from which the cases come, and an increase in the predisposing diseases, are likely to account for the change.

The increasing interest in intussusception is still further shown in the following abstract (A), in which the cases are grouped according to the duration of the symptoms. In the tables there are only 5 cases treated at 6 hours or under. The contrast between the number of cases in which the symptoms were over 6 hours and under 12 hours is very marked, for the actual figures are 5 in Table I., and 10 in Table II.; and if this latter figure were multiplied by $3\frac{1}{3}$ to equalise them in point of time, the ratio would be 5 to 33. Similarly, if the figures for the cases with symptoms of 24 hours, which are almost equal in the two tables, were corrected, the proportion would be 17 to $16 \times 3\frac{1}{3} = 53$, and those for 48 hours, 16 to $14 \times 3\frac{1}{3} = 46$.

In this abstract, the percentage figures refer to the total number of cases in each table.

Abstract A.

Showing the proportion of cases, and the results, classified according to the duration of symptoms.

Duration of Symptoms.	Table I. Number of cases.	Table I. Percentage.	Table I. Deaths.	Table I. Recoveries.	Table II. Number of cases.	Table II. Percentage	Table II. Deaths.	Table II. Recoveries
6 hours	3	4.6	2	1	2	3.3	—	2
12 „	5	7.8	1	4	10	16.9	3	7
24 „	17	26.6	10	7	16	27.1	6	10
48 „	16	25.0	11	5	14	23.7	11	3
3 days	3	4.6	2	1	7	11.8	7	—
4 „	6	9.3	5	1	4	6.7	3	1
7 „	5	7.8	5	—	2	3.3	2	—
2 weeks	1	1.5	1	—	2	3.3	1	1
3 „ or longer	—	—	—	—	1	1.6	1	—
Not stated	8	—	6	2	1	—	1	—
Totals	64	—	43	21	59	—	35	24

Abstract A illustrates an improvement in the results for all cases of 24 hours' illness and under, except those of 6 hours, in which the number is so small that percentage results would be misleading. There were 7 out of 10 cases of 12 hours in the second table which recovered, whereas the recoveries in the first table amounted to 4 out of 5 cases. The results after 12-24 hours' illness are improved from 41.1 per cent. of recoveries in Table I. to 62.5 per cent. in Table II. The later figures, for patients who were from 24 to 48 hours ill, are rather worse than the earlier ones, and the mortality is so great for all cases of over two days' illness that they are practically hopeless. The proportion of recoveries over both series of cases is 60 per cent. for those of 6 hours, 73.3 per cent. for those of 12 hours, 51.5 per cent. for those of 24 hours, and 26.6 per cent. for those of 48 hours. There can be no stronger argument in favour of early surgical treatment.

Intimately connected with the duration of the disease, the amount of operative interference has a marked bearing on the result, as is shown in Abstract B. The cases are classified according to the nature of the treatment, and it should be remarked that as some of the cases were operated upon after relapse, the number of operations is greater than the number of cases.

ABSTRACT B.

Showing the results of different modes of treatment.

Operations.	Table I.			Table II.		
	Relapses.	Deaths.	Recoveries.	Relapses.	Deaths.	Recoveries.
Hydrostatic method and manipulation.	1	—	2	2	—	1
Laparotomy and reduction . .	—	24	19	—	14	22
Resection, anastomosis, colostomy .	—	14	1	—	16	1
Laparotomy, no reduction . .	—	2	—	—	2	—
No operation, and not stated . .	—	2	—	—	1	1

This abstract shows that there were three cases in each table treated by the hydrostatic method with taxis, that one in the first table and two in the second table recurred, there being three successes and no deaths. It should be stated, however, that in quite a number of cases the hydrostatic method was employed, as a preliminary to operative intervention, in order to reduce the size of the intussusception before the abdomen was opened. The records of these cases are so incomplete that no definite statement can be made as to the number of cases in which the use of the hydrostatic method was followed by laparotomy on account of the non-success of that method. It may be stated, however, that the routine practice in two of the cliniques, from which over 30 cases are taken for these

tables, is to try the hydrostatic method first, and so it would seem that the proportion of failures is greatly in excess of the successes.

When the operative measures consisted of laparotomy and reduction, the successes were only 19 (44.1%) out of 43 operations in the first table, and 22 (61.1%) of the 36 operations in the second table. This improvement in the later table is probably due to the greater proportion of cases treated within 24 hours of the onset of the disease (see Abstract A), the proportion of reducible cases being greater and the difficulties of reduction less on account of the relative paucity of adhesions.

Operations of greater severity, including resections, anastomoses, and colostomies, have been almost uniformly fatal, or perhaps it would be better to say that when an acute intussusception was found to be irreducible after the abdomen had been opened, the case was practically hopeless. In the first table of 14 such operations, only one recovery resulted, and in the second table there was but one success out of 17 cases. The first recovery (Table I., No 45) was in a patient of 17 years after an illness of 4 days, and the operation was enterectomy in an ileo-ileac intussusception. The second case (Table II., No. 12) occurred in a patient of 10 years after being 4 days ill, the operation being also resection in an enteric intussusception. In each of these cases the Murphy's button was used, and it is possible that the saving of time so effected was a factor in the success. It must be noted, however, that neither of the patients was an infant.

Of the three cases in which no operation was performed the patients were obviously dying in two, and in the third, either the invagination was reduced spontaneously, or there was an error of diagnosis (Table II., No. 24). In four cases the intussusception was found irreducible, and the condition of the patients did not warrant further operative interference.

In these tables it is abundantly clear that males are more frequently attacked by this disease than females, the proportion being M. 89 to F. 34. The age incidence is also interesting, as will be seen from the following abstract :—

ABSTRACT C.

	Months.		Years.										
	6	12	2	3	4	5	6	8	10	12	14	20	over 20
Table I.	27	20	3	6	—	—	—	—	—	—	1	2	4
Table II.	25	20	4	1	1	2	2	—	1	1	—	—	—
													—
Totals.	52	40	7	7	1	2	2	—	1	1	1	2	4
	92 = 74%		19 = 15.4%						5 = 4%				4 = 3%

These figures confirm the teaching that intussusception is for the most part a disease of early infancy, for three-fourths of the cases occurred in babies of 12 months or less, and, of the remainder, 15% occurred between the ages of 1 and 8 years, 4% between 8 and 20 years, and 3.2% in persons over 20 years of age. In one case the intussusception seems to have occurred at birth (Table II., No. 8).

Abstract D shows the relative frequency of the varieties of invaginations; it presents no new features, and is only made for the sake of completeness.

ABSTRACT D.

Showing the ratio of the different varieties of invaginations and results.

Varieties.	Table I.		Table II.		Both Tables.		Totals.
	Deaths.	Successes.	Deaths.	Successes.	Deaths.	Successes.	
Ileo-cœcal . .	13	13	7	6	20	19	39
Ileo-colic . .	7	1	1	7	8	8	16
Ileo-ileac. . .	6	2	3	1	9	3	12
Colic	2	—	1	1	3	1	4
Multiple — two separate invags.	—	1	2	—	2	1	3
Double . .	—	—	1	—	1	—	1
Triple	—	—	1	—	1	—	1
Not stated . .	11	7	17	11	28	18	46

(1 case in which no particulars were given.)

The multiple invaginations were one "Ileac and Ileo-colic," and two "Ileac and Ileo-cœcal." The double intussusception was Ileo-cœcal, and the triple invaginations had a Meckel's diverticulum at the apex.

In reviewing the foregoing statistics one is impressed with the heavy mortality and depressed by the apparent futility of treating the irreducible cases and those of two days' or longer

duration. As compared with another cause of intestinal obstruction, such as strangulated hernia, the figures show badly.

RELATIVE MORTALITY OF INTUSSUSCEPTION and STRANGULATED HERNIA.

Barker. 73 cases, death rate, .	82%	Treves. ("Op. Surgery"), death rate, .	30%
Heaton. 104 cases, death rate, .	63%	Hutchinson, J., Junr. 140 cases. .	25%
Present collection, .	63%		
	69.5%		27.5%

It will be at once suggested that these figures are not comparable, for the reason that 75 per cent. of all intussusceptions occur in infants, whereas the majority of cases of strangulated hernia are seen in adults. That objection is to some extent well founded, and, if taken in conjunction with the fact that in every case of obstruction the first inquiry and examination is in the direction of hernia, may partially explain the discrepancy. The existence of an irreducible hernia with symptoms of obstruction is a tangible and unmistakable token that surgical interference is necessary. It has hitherto been otherwise with intussusception. When the clinical features of acute invagination of the bowel in infants are as familiar as those of strangulated hernia, the results of treatment will greatly improve. What better proof of this contention is necessary than that given in Abstract A, where it is shown that of all cases treated within twenty-four hours of the onset of the symptoms, 61.9 per cent. recovered?

The handicap of an infantile weakness, unstable nervous equilibrium, liability to shock and excessive reaction, will always influence the results of treatment of intussusception adversely. So too, the inability of the patient to supplement the objective signs with subjective symptoms, and the lack of knowledge on the part of parents and nurses, are barriers to early recognition of the disease.

On the other side, it must be contended that the operative treatment of intussusception during the first twenty-four hours is for the most part simple and of short duration. Except

when the invagination is irreducible, fifteen minutes should suffice for a laparotomy and reduction, and any operation which in infantile and acute cases extends beyond half an hour greatly increases the mortality. "Shock" is given as the cause of death in the majority of unsuccessful cases, and though that term must include the shock which began at the onset of the invagination and continued, increasing in severity, till reduction was effected, in addition to the trauma and manipulation during the operation, it is fairly evident that the effects of toxic absorption have been included under that name ("Kocher-Darmobstruction," s. 461, quoted by Boas, "Diseases of the Intestines," p. 421). The hyperpyrexia so often seen in these cases, though partly due to reaction, is probably greatly increased by auto-intoxication, for it is seen in patients whose illness was of short duration, and whose operation was short and simple.

Any discussion on the operative measures to be adopted in the treatment of intussusception will naturally fall into two groups dealing with the reducible and the irreducible cases. It is not possible to tell before opening the abdomen, in the majority of cases, whether reduction will be possible or not, and so the preparations and the laparotomy should be made suitable for both. The preparations will include the provision of such aids to resection, anastomosis, or colostomy, as are familiar to, and preferred by, the operator. The laparotomy wound is generally a mesial incision in the linea alba, and of sufficient size to admit two or three fingers in the first instance. Two fingers in the abdomen, aided by the other hand outside the anterior abdominal wall suffice to convey the intussusception to the wound, diminishing its size by partial reduction as it comes. A little pressure and gentle traction may suffice to complete the reduction; but if, as is usual, the apex and the last two or three inches are very adherent, it is wise to lift the mass out through the wound. It is then possible to separate adhesions by the use of the blunt scoop of a director or a blunt dissector, and the process of reduction is greatly facilitated by the direct pressure of a little finger on the apex, the wall of the bowel beyond the tumour being invaginated by the finger used for that purpose. Compresses of warm sterile water

should be used to cover the skin round the wound during the operation ; and if a single layer of sterile gauze, preferably moistened in a similar fluid, be used to cover the intussusception during its manipulation, a better control of the bowel is obtained and the process of reduction is thereby aided.

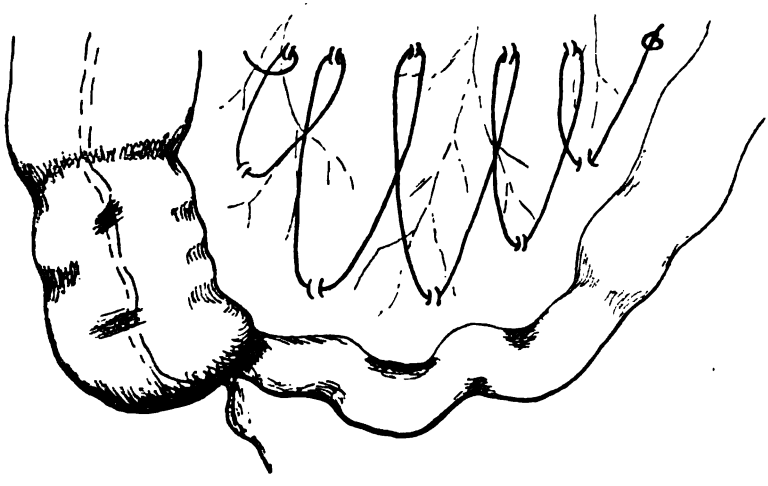

FIG. 1.—Position of Suture.

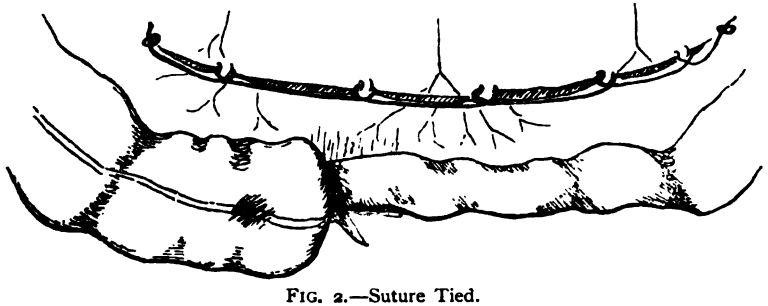

FIG. 2.—Suture Tied.

After reduction, it is the general practice to return the bowel just as it is reduced. Some years ago, after a personal experience of some relapses, the writer devised a method of suturing the mesentery similar to that of reefing a sail, and has used it in almost every case since then. The position of the suture is explained by the accompanying sketches (Figs. 1 and 2). Care is taken that the needle takes little

but peritoneum, and that the vessels of the mesentery are avoided. Since the publication[1] of this method it has been employed by a few surgeons, and in the only two post-mortem examinations made, no relapse and no thrombosis of the vessels had occurred (Nos. 6 and 21 of Table II.). By the use of a continuous suture the reef can be made in a few seconds, and therefore it does not prolong the operation unduly.

The problem of dealing with an irreducible intussusception is a more difficult one, for, with the exceptions above noted, failure has attended all operations for the relief of the obstructions. The rational operation is enterectomy, since it follows the lines of Nature's cure and removes the diseased bowel, together with all the products of bacterial activity contained in it. But the almost uniform failure of this operation has apparently led surgeons to perform colostomy, enterostomy, and intestinal anastomosis in order to avoid that fatality of result. The records, however, show that these procedures are also followed by failure, and there seems to be no reason why they should be preferred, especially as they have the further disadvantage of leaving the diseased tissues within the abdomen. To leave the intussusception *in statu quo* is to acquiesce in the patient's death; its removal seems to hasten that end; but inasmuch as occasional successes are recorded, it is more humane to give the patient what at best may be called a fighting chance. The successful cases recorded in the annexed tables amount to only 6.6%, but they are lives saved. In these cases the Murphy's button was used, and in other cases also; various methods have been employed by different surgeons, and there seems to be room for an operation which can be performed in the shortest period of time, with a minimum of shock to the patient, and suitable for bowel of the diminutive size found in infants. It is natural that each surgeon should prefer the method with which he is most familiar and at which he is most dexterous, and if the suggestion is made that the end-to-end method, with a fine continuous catgut suture, be employed, it is only because, in other cases than intussusception, it has been satisfactory in point of time, secure in point of

[1] *Glasgow Medical Journal*, October 1903.

efficiency, and free from the objection of leaving a foreign body in the lumen of the bowel.

It may be taken as fairly established that the lack of success in these operations is due in a much greater degree to the shock and collapse brought on by the intussusception prior to surgical intervention than to the operative procedures, and that little improvement can be expected except in the direction of earlier diagnosis and treatment. Granted that in a few cases the invagination is irreducible within a few hours of its commencement, it is nevertheless true that, in the great majority of cases, reduction can be effected within 24 hours, and the major operations rendered unnecessary. With a view to diminishing the mortality of the minor cases in which reduction is effected, it is suggested that the intussuscepted portion might be flushed through with saline solution or some similar fluid, so as to remove the effused septic products. This could be done by applying a light clamp to the bowel above the site of the reduced invagination and introducing the fluid through a hollow needle or canula, the aperture being afterwards secured by a single suture. The after-treatment follows the usual lines of post-operative attention of abdominal cases, particular care being taken to promote warmth. The use of salines per rectum has been found of marked benefit. Hypodermic injections of strychnine up to $\frac{1}{8}$ grain, in infants apparently dying immediately after operation, are of great value.

In conclusion, it is submitted that the foregoing figures and details show that there is a small balance of recoveries over deaths for all cases of intussusception of 24 hours' duration, or less; that failures are in the majority when the disease is of 48 hours, or longer; that the simpler operations have a fair measure of success—but that when the pathological condition of the invagination necessitates operative measures of greater gravity, almost uniform failure results. These results indicate that progress in the treatment of intussusception must be in the direction of earlier recognition and surgical interference. In the matter of operative technique, the brevity of the operation and the prevention of relapse are the important points, and there is room for measures calculated to prevent or overcome the toxæmia which is often so marked after the simpler operation of laparotomy and reduction.

TABLE I.

SHOWING THE SALIENT FEATURES OF ALL THE CASES OF INTUSSUSCEPTION FROM APRIL 1893 TO APRIL 1903.

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
1.	M.	4 mo.	24 hrs.	Pain. Emesis. Blood. Mucus. No tumour. Exam. under chloroform — tumour above umbilicus.	Ileo-colic.	Laparotomy. Reduction, Appendectomy.	Died.	18 hours after op.
2.	M.	7 mo.	2 days.	Emesis. Tenesmus. Blood. Some fœcal matter.	Ileo-cœcal.	Laparotomy, Reduction. Cœcum opened to allow bowel to collapse.	Success.	
3.	M.	8 mo.	48 hrs.	Emesis. Blood P.A. Tenesmus. Tumour upper part of ascendg. colon.	Ileo-colic.	Laparotomy. Reduction.	Died.	Shock. Temp. 107° after operation.
4.	M.	5 mo.	43 hrs.	All symptoms. Tumour left iliac, and P.R.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Temp. rose to 105° F. Death 38 hours after operation. P.M. —gangrene of cœcum.
5.	M.	5 mo.	30 hrs.	All symptoms. No abdominal tumour, nor P.R.	Ileo-cœcal.	Laparotomy. Reduction—easy.	Success.	3 inches of intussn.

6.	F.	6 mo.	3 days.	All symptoms. Abdominal tumour left iliac, and P.R. Collapse.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Shock, 8 hours after operation. 4 clay-coloured motions before death. Tetany.
7.	F.	5 mo.	48 hrs.	All symptoms. Tumour left iliac and P.R. Fœcal vomiting.	Not stated.	Laparotomy. Reduction.	Success.	
8.	F.	9 mo.	24 hrs.	All symptoms. Fœcal vomiting.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	22 hours after operation. Fœcal vomiting. Possible recurrence.
9.	M.	6 mo.	24 hrs.	Habitual constipation. Cold, purgative, sudden onset. All symptoms. Tumour left iliac, not P.R.	Not stated.	Laparotomy. Reduction—easy.	Success.	
10.	F.	5 mo.	24 hrs.	All symptoms. Tumour above umbilicus, transverse, not P.R.	Not stated.	Laparotomy. Enterectomy.	Died.	24 hours. Shock?
11.	F.	2 yrs. & 3 mo.	24 hrs.	All symptoms. Tumour left hypochondrium, not P.R.	Not stated.	Laparotomy. Reduction—easy.	Died.	Peritonitis.
12.	M.	3 mo.	2 days.	All symptoms. Tumour left iliac and P.R.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	
13.	M.	4 mo.	48 hrs.	All symptoms. Distension.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Shock. P.M. ileo-cœcal intussn. discovered. Relapse?
14.	M.	6 mo.	Not stated.	All symptoms. Tumour distinct in left lumbar (iliac?).	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Shock? P. M. negative.

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
15.	M.	4 mo.	48 hrs.	All symptoms. No abdominal tumour, nor P.R.	Ileo-cœcal.	Laparotomy. Reduction.	Recovery.	
16.	M.	11 mo.	32 hrs.	All symptoms. Tumour in left iliac. Abdomen flaccid.	Not stated.	Laparotomy. Reduction—easy. Second laparatomy next day. Bloody fluid evacuated.	Died.	Obstruction not relieved. Relapse.
17.	M.	5 mo.	30 hrs.	All symptoms. Tumour in left lumbar (iliac?).	Ileo-colic, extending to sigmoid.	Laparotomy. Reduction.	Died.	Shock. Temperature rose to 108° F.
18.	M.	7 mo.	6 days.	Blood. Mucus. Abdominal distension. Resistance on left side. P.R. negative.	Ileo-cœcal.	Laparotomy. Irreducible.	Died.	Gangrene.
19.	M.	$2\frac{6}{12}$ yrs.	9 days.	Emesis. Blood and mucus P.A. ceased six days before admission. Abdomen distended. Dulness in left flank. P.R. mass felt. Flatus passed.	Colic.	Laparotomy. Reduction.	Died.	Shock.
20.	M.	7 mo.	4 days.	Fœcal vomiting. Blood. No distension. Tumour on left side of abdomen and P.R.	Not stated.	Laparotomy. Reduction. Excision of gangrenous bowel.	Died.	Shock.
21.	M.	5 mo.	Not stated.	Not stated.	Not stated.	Laparotomy.	Died.	Shock.

22.	M.	3 yrs. & 1 mo.	4 days.	All symptoms. Abdomen flaccid. Hyperperistalsis. Tumour P.R. but not externally.	Ileo-cœcal.	Laparotomy. Resection.	Died.	
23.	M.	5 mo.	6 hrs.	Blood, mucus. Tumour in left iliac region.	Ileo-colic.	Laparotomy. Reduction.	Died.	Small blood-stained motion after operation. Possible recurrence.
24.	M.	8 mo.	Not stated.	Not stated.	Not stated.	Not stated.	Not stated.	
25.	M.	7 mo.	24 hrs.	All symptoms. No distension. No tenderness.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	
26.	M.	2 mo.	24 hrs.	All symptoms. Abdomen flaccid. No tenderness. Tumour left iliac.	Not stated.	Reduction by hydrostatic pressure.	Success.	Recurrence next day. Similarly relieved.
27.	M.	6 mo.	24 hrs.	All symptoms. Tumour felt. Exam. P.R. negative.	Ileo-cœcal.	Laparotomy. Enterostomy. Irreducible.	Died.	Shock.
28.	M.	7 mo.	12 hrs.	Pain; blood and mucus. P.A.; tenderness. No distension. No tumour. Exam. P.R. negative.	Ileo-cœcal.	Laparotomy. Reduction.	Recovery.	
29.	F.	2 yrs. & 6 mo.	4 days.	Emesis slight.	Not stated.	Laparotomy. Reduction. Right colostomy.	Died.	Septic peritonitis.
30.	M.	2 yrs. & 6 mo.	Not stated.	Emesis. Blood P.A. No distension. Tumour on left side of abdomen.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
31.	M.	4 mo.	Not stated.	All symptoms. No distension. Tumour on left of abdomen.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	
32.	F.	5 mo.	Not stated.	Tenesmus, pain, blood, per anum.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Shock.
33.	M.	8 mo.	24 hrs.	Emesis. Blood P.A. Tenderness of abdomen.	Ileo-cœcal.	Laparotomy. Reduction.	Recovery.	
34.	F.	1 yr. & 9 mo.	Few hrs.	Blood and mucus P.A. Tumour felt in epigastrium.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Death 16 hours after operation. Asthenia.
35.	F.	19 yrs.	3 days.	All symptoms.	Ileo-ileac.	Laparotomy. Reduction.	Died.	Peritonitis.
36.	F.	7 mo.	2 days.	Not stated.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Shock, in 12 hours.
37.	M.	9 mo.	1 day.	Blood and mucus. P.A. Tenesmus. No tumour palpable.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	Shock, in 2 days.
38.	M.	1 yr. & 1 mo.	1 day.	Pain, diarrhœa. No tumour felt.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	
39.	M.	8 mo.	Not stated.	Pain, obstruction. Tumour felt P.R.	Not stated.	Enema.	Success.	
40.	M.	2 yrs.& 8 mo.	Not stated.	Previous intussn. reduced by enemata. Tumour felt P.R. and in left iliac.	Not stated.	Reduced by enema, returned in 2 hrs. Laparotomy. No intussn. 6 ins. congested bowel.	Death.	Few hours.
41.	F.	5 mo.	1 day.	Blood, constipation. Tumour to right of umbilicus.	Ileo-cœcal.	Laparotomy. Reduction.	Recovery.	

42.	M.	7 mo.	Few hrs.	Blood. Diarrhœa.	Not stated.	Laparotomy. Reduction.	Recovery.	
43.	M.	24 yrs.	5 days.	Obstruction. No tumour felt.	Enteric.	Laparotomy. Excision of bowel and tumour. Murphy's button.	Died.	Collapse in 8 hours.
44.	M.	9 mo.	Less than 12 hrs.	All symptoms. Tumour left lower quadrant to umbilicus.	Not stated.	Laparotomy. Reduction. Appendectomy.	Success.	
45.	F.	17 yrs.	4 days.	Obstruction. Griping pains lower right abdomen. Emesis.	Enteric.	Laparotomy. Resection. Murphy's button.	Success.	
46.	M.	3 mo.	24 hrs.	Tumour left abdomen and P.R.	Ileo-colic.	Laparotomy. Reduction—difficult.	Died.	Shock in 12 hours.
47.	M.	6 mo.	6 days.	Not stated.	Ileo-colic.	Colostomy.	Died.	5d'ys afteroperation
48.	M.	42 yrs.	6 days.	Preceded by diarrhœa.	Enteric.	Resection of gangrenous 4 in. of ileum.	Died.	12 hours after operation. Shock.
49.	M.	21 yrs.	2 days.	Obstruction and hiccough.	Enteric.	Resection.	Died.	Shock.
50.	M.	4 mo.	4 days.	Tumour in abdomen and in rectum. Reduced by enemata and taxis. Relapse next day.	Not known.	No operation. Refused by the parents.	Died.	At home. Relapse.
51.	M.	13 yrs.	7 days.	No tumour palpable.	Enteric.	Enterectomy, 3 ins. of ileum.	Died.	Shock, 6 hours after operation.
52.	M.	6 mo.	12 hrs.	Tumour in left hypochondm.	Not stated.	Enterectomy (1 hr. 30 min.).	Died.	12 hours later. Hyperpyrexia.
53.	M.	7 mo.	2 days.	Tumour in left hypochondm.	Not stated.	Enterectomy.	Died.	12 hours. Hyperpyrexia.
54.	F.	2 yrs.& 6 mo.	24 hrs.	Diarrhœa 7 days before obstruction. Tumour in left hypochondm.	Not stated.	Laparotomy. Reduction.	Died.	Shock.

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
55.	F.	1 wk.	4 days.	No tumour. Prolapse of rectum.	Ileo-colic.	Colostomy.	Died.	Shock. P.M. shewed intussn. to and through anus.
56.	F.	7 mo.	8 hrs.	Tumour in left hypochondm.	Not stated.	Laparotomy and reduction.	Success.	
57.	F.	7 mo.	2 days.	Tumour to left of umbilicus.	Ileo-colic.	Laparotomy. Reduction.	Died.	Shock, 6 hours.
58.	F.	6 mo.	6 hrs.	Tumour to left of umbilicus.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	
59.	F.	1 yr.	3 days.	Distension. No tumour. Previous intussusception reduced by enemata.	Ileo-cœcal & enteric.	Laparotomy and reduction of both. Mesentery reefed.	Success.	
60.	F.	3 mo.	21 hrs.	Usual symptoms. Epigastric tumour.	Ileo-colic.	Laparotomy. Reduction difficult.	Success.	
61.	M.	5 mo.	24 hrs.	Not stated.	Not stated.	Laparotomy. Reduction. Appendectomy.	Died.	
62.	M.	10 mo.	24 hrs.	Usual symptoms. Tumour in left flank.	Ileo-cœcal.	Laparotomy showed invagination previously reduced by enemata.	Success.	
63.	M.	18 mo.	34 hrs.	Diarrhœa 3 days before onset of intussusception. Tumour in left flank.	Colic.	Laparotomy. Reduction.	Died.	Relapse, 1 month after operation; no second operation.
64.	M.	30 yrs.	2 days.	Symptoms followed a dose of sodii bicarb. Marked distension.	Ileac.	Laparotomy. Intussusception found reduced.	Died.	Symptoms of relapse; no P.M.

TABLE II.

SHOWING THE SALIENT FEATURES OF ALL THE CASES OF INTUSSUSCEPTION FROM APRIL 1903 TO APRIL 1906.

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
1.	M.	5 mo.	12 hrs.	Not stated.	Not stated. (Colic?)	Hydrostatic reduction. Relapse in 12 hours. Laparotomy and resection of part of colon.	Died.	Shock (a few hours after operation). No P.M.
2.	M.	7 mo.	24 hrs.	Not stated.	Not stated.	Manual reduction under $CHCl_3$. Relapse next day. No further operation.	Died.	52 hours after admission. Relapse.
3.	M.	4 mo.	24 hrs.	Pain. Emesis. Blood P.A. Tumour left iliac fossa.	Not stated.	Laparotomy and reduction.	Died.	2 days after operation.
4.	M.	11 mo.	A few dys.	Emesis. Blood in fœces. Temperature 102 F. Tumour l. inguinal region.	Ileo-cœcal.	Laparotomy. Intussusception irreducible. No resection.	Died.	2 hours after operation.
5.	M.	11 yrs.	9 days.	Obstruction of 9 days. Fœcal vomit 1 day. No blood, no tumour.	Small intestine.	Laparotomy. Resection.	Died.	3 hours after operation. Small tight intussusception with perforation.

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
6.	M.	9 mo.	12 hrs.	Sudden. Usual symptoms. Tumour in abdomen.	Ileo - cœcal and ileac.	Laparotomy reduction. Appendectomy. Mesentery shortened.	Died.	P.M. No recurrence. One P.M. invagination.
7.	M.	4 mo.	28 hrs.	Usual symptoms. Tumour in abdomen and rectum.	Not stated.	Laparotomy. Reduction.	Died.	Temperature after operation 106° F. 14 hours.
8.	M.	5 mo.	20 hrs.	Onset sudden. No palpable tumour.	Ileo-colic.	Laparotomy. Reduction. Appendectomy. Mesentery reefed.	Recovery.	Appendix adherent to bowel.
9.	F.	5 days.	5 days.	Blood P.A. from birth. Hæmatemesis 1 day. Tumour in abdomen and rectum.	Ileo-cœcal.	Laparotomy. Irreducible, gangrenous with perforation.	Died.	In a few hours.
10.	M.	6½ mo.	Not stated.	Tumour to right of umbilicus.	Not stated.	Laparotomy. Reduction and reefing of mesentery.	Recovery.	
11.	M.	8 mo.	3 days.	Fœcal vomit for 24 hours. Tumour to left of umbilicus.	Not stated.	Laparotomy. Reduction.	Died.	No P.M.
12.	M.	10 yrs.	4 days.	Constipation. Slight tenderness. Stain of blood P.A. No tumour, tenesmus, or distension.	Ileo-ileac.	Laparotomy. Enterectomy. Murphy's button.	Recovery.	Button passed on 8th day.

13.	M.	4 mo.	2 days.	[illegible] emesis slight. No tumour or tenesmus.	[illegible] and ileo-colic.	[illegible] section.		ileac invagination was irreducible. Another member of the family had an intussusception.
14.	F.	7 mo.	2 days.	All symptoms. Tumour left iliac.	Ileo-colic.	Laparotomy. Reduction easy.	Died.	
15.	F.	6 mo.	2 days.	All symptoms. Tumour to left of mid-line.	Ileo-cœcal.	Laparotomy. Reduction.	Recovery.	
16.	M.	11 mo.	14 hrs.	Tumour at right hepat. flexure.	Ileo-colic.	Laparotomy. Reduction.	Success.	
17.	M.	9 mo.	2 days.	Tumour to left of umbilicus.	Colic.	Laparotomy. Reduction.	Success.	
18.	M.	6 yrs.	3 weeks.	Abdominal distension. No tumour felt. Patient *in extremis*.	Not stated.	Laparotomy. Resection.	Died.	During operation.
19.	F.	9 mo.	28 hrs.	Sudden. Blood P.A. 45 minutes after onset.	Double ileo-cœcal.	Laparotomy. Reduction.	Died.	Fœcal vomit 9 hours after operation. P.M. Nothing found.
20.	M.	4 mo.	3 days, 8 hrs.	Sudden. Abdominal tumour, left iliac. Distension.	Ileo-cœcal.	Laparotomy. Reduction difficult. Colon opened.	Died.	Temperature rose to 105° F. Vomited blood.
21.	M.	7 mo.	25½ hrs.	Sudden. Blood P.A. 1 hour after onset. Tumour left iliac region.	Not stated.	Laparotomy. Reduction. Mesentery reefed. Ecchymosis and exudate.	Died.	Temp. rose to 108° F. P.M. No recurrence and no thrombosis.
22.	F.	5 yrs.	3 days.	Sudden. All symptoms. Abdominal tumour and P.R. Hydrostatic method failed.	Ileo - ileac, apex 18 in. from valve.	Laparotomy. Irreducible. Excision Maunsell's method.	Died.	18 hours after operation.

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
23.	F.	4 mo.	4 days.	All symptoms. Tumour P.R. Collapse	Ileo-cœcal.	No operation.	Died.	P.M. Intussusception easily reduced.
24.	M.	5½ yrs.	10 days.	Diarrhœa. Emesis. Collapse. No tumour, blood, or mucus P.R. Exam. under chloroform. No abdominal tumour.	= ?	No operation.	Recovery.	After a dose of Ol. Ricini.
25.	F.	6 mo.	2 days.	Sudden. All symptoms. Tumour P.R.	Not stated.	Laparotomy. Enterectomy.	Died.	
26.	M.	3 mo.	12 hrs.	Sudden in course of diarrhœa.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	
27.	F.	6 mo.	12½ hrs.	All symptoms. Tumour in rectum and abdomen, l. iliac region.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	
28.	M.	4 mo.	3 days.	Sudden. All symptoms. Tumour rt. iliac region, not per rectum. Distension.	Not stated.	Laparotomy. Enterectomy.	Died.	4 hours after operation.
29.	M.	4 mo.	12 hrs.	Sudden. All symptoms, except blood per A. Abdominal tumour rt. iliac region, none P.R.	Not stated.	Laparotomy. Reduction.	Success.	
30.	M.	8 mo.	3 days.	Sudden. All symptoms. Tumour in l. iliac	Not stated.	Laparotomy. Enterectomy.	Died.	4 hours after operation.

31.	M.	13 mo.	7 days.	Bowel protruded through anus: apparently reduced but relapsed day before admission. 1 ft. 6 in. of bowel protruding.	Ileo-colic.	Enterectomy.		
32.	M.	1 yr.	A few hrs.	Diarrhœa for 2 or 3 days. Protrusion of bowel 3 hours before admission.	Not stated.	Hydrostatic method and manipulation.	Success.	
33.	M.	$4\frac{7}{12}$ yrs.	13 hrs.	All symptoms. Tumour left side of abdomen.	Ileo-colic.	Laparotomy. Reduction.	Success.	
34.	M.	5 mo.	2 days.	All symptoms.	Not stated.	Hydrostatic, followed by Laparotomy and reduction.	Died.	Shock.
35.	M.	8 mo.	1 day.	All symptoms.	Not stated.	Laparotomy and Enterectomy.	Died.	
36.	F.	3 mo.	2 days.	All symptoms. Tumour left iliac region.	Not stated.	Laparotomy. Reduction.	Success.	
37.	M.	4 mo.	19 hrs.	All symptoms.	Not stated.	Laparotomy, partial reduction, anastomosis.	Died.	
38.	M.	= ?	6 hrs.	Not stated.	Not stated.	Laparotomy. Reduction. Appendectomy.	Success.	
39.	M.	8 mo.	36 hrs.	No motion of the bowels for $4\frac{1}{2}$ days.	Not stated.	Laparotomy. Resection.	Died.	
40.	F.	5 mo.	17 hrs.	Tenesmus. No vomiting, no blood or mucus P.A. No tumour.	Ileo-colic.	Laparotomy. Reduction—easy.	Success.	

No.	Sex.	Age.	Duration of Symptoms.	Symptoms.	Variety of Intussusception.	Operation.	Result.	Remarks.
41.	M.	8 mo.	24 hrs.	Emesis only at onset. Abdominal tumour.	Not stated.	Laparotomy. Reduction.	Success.	
42.	M.	6 mo.	24 hrs.	Sudden pain, vomit, tenesmus. Blood P.R. 2 hours after onset. Tumour left iliac and in rectum.	Not stated.	Laparotomy. Reduction—easy.	Died.	Septic peritonitis.
43.	M	10 mo.	10 hrs.	Sudden onset, blood P.A. 2 hours later. All symptoms except tenesmus. Tumour in left hypochond. not per anum.	Not stated.	Laparotomy. Reduction—easy.	Died.	Shock (?) P.M. no recurrence. P.M. intussusception.
44.	F.	1½ yrs.	4 days.	All symptoms. Latterly distension. Abdominal tumour.	Meckel's diverticulum at apex.	Laparotomy. Reduction. Triple intussusception.	Died.	Temp. rose to 106° F.
45.	M.	10 mo.	3 days.	Sudden onset. All symptoms. No abdominal tumour nor P.R.	Ileo-cœcal.	Laparotomy. Reduction.	Died.	
46.	F.	18 mo.	24 hrs.	Sudden. No tumour P.R. Abdominal tumour to left of umbilicus.	Ileo-colic.	Laparotomy. Reduction.	Success.	
47.	M.	4 mo.	24 hrs.	All symptoms. Tumour to left of rectus.	Ileo-cœcal.	Laparotomy. Reduction easy.	Success.	Temp. rose to 104° F.
48.	M.	15 mo.	9 hrs.	All symptoms. Tumour in left hypochond.	Ileo-cœcal.	Laparotomy. Reduction easy.	Success.	Temp. rose to 104° F.

49.	M.	6 mo.	24 hrs.	dominal tumour.	Not stated.	Laparotomy. Reduction.	Success.	
50.	M.	– ?	12 hrs.	All symptoms. Tumour in rt. side abdomen.	Not stated.	Laparotomy. Reduction.	Success.	
51.	M.	9 mo.	some hrs.	Pain, bloody mucus.	Ileo-cœcal.	Laparotomy. Reduction.	Success.	
52.	M.	4 mo.	24 hrs.	Vomit, bloody mucus.	Ileo-colic.	Laparotomy. Reduction.	Death.	Shock.
53.	M.	1 yr.	some hrs.	Vomit, bloody mucus.	Not stated.	Laparotomy. Reduction.	Success.	
54.	F.	4 mo.	24 hrs.	Vomit and bloody mucus.	Not stated.	Laparotomy. Reduction.	Success.	
55.	F.	4 yrs.	2 dys.	Pain, vomit, and bloody mucus.	Not stated.	Laparotomy. Resection.	Death.	Shock.
56.	M.	8 mo.	2 dys.	Pain, vomit, and bloody mucus.	Ileo-cœcal.	Laparotomy. Reduction.	Death.	Shock.
57.	M.	5 mo.	30 hrs.	Pain, vomit, and blood in motion.	Ileo-cœcal.	Laparotomy. Reduction.	Death.	Shock.
58.	F.	6 mo.	2 dys. or more.	Pain, vomit, and blood in motion.	Not stated.	Laparotomy. Resection.	Death.	Shock.
59.	M.	2 yrs.	6 hrs.	Pain and vomit.	Ileo-colic.	Laparotomy.	Success.	

Operation was undertaken at 4 P.M. on the day of his admission. On opening the abdomen a fœtid odour at once became evident, and a gangrenous intussusception of the ileum about eight inches long was soon discovered to be the cause. The bowel affected, which was clearly beyond hope of recovery, was resected, care being taken that the lines of section passed through healthy bowel well beyond the gangrene. An end-to-end anastomosis by suture was performed. In spite of every effort to stimulate him, he sank and died three hours later.

CASE IV.—Ileo-cæcal intussusception in a child 3 months old—operation after 18 hours—death 10 days afterwards from fæcal fistula and pneumonia.

W. A., a male child, aged 3 months, suffering from intussusception, was sent by Dr Ogston, Rosemount, Aberdeen, to the Royal Infirmary on the 3rd October 1902. It had been perfectly well the previous day, its bowels having moved naturally in the afternoon, but at 8 P.M. it commenced screaming and spent a very restless night. At 3 A.M. on the day of admission a spot of blood was noticed for the first time on the napkin by the mother. At 8 A.M. a considerable blood-stained discharge was observed, and Dr Ogston, who was sent for, promptly ordered its removal to hospital. A distinct sausage-shaped tumour was palpable in the umbilical region.

In the absence of Mr Riddell and his assistant, under whose care the child was admitted, the writer was asked to undertake the operation. This was performed between 1 and 2 P.M., about 18 hours after the apparent onset of the trouble. Through a small median abdominal incision, an ileo-cæcal intussusception about 5 inches in length was found and reduced. The appendix was much congested and darkened, as also was the cæcum, especially in spots. The abdominal wound was closed by through-and-through sutures of silk-worm gut. The child's temperature, from having been 97° F. prior to operation, shot up the day afterwards to 105° F., and its pulse reached 180. From this point, however, the temperature and pulse gradually declined until, on the evening of the 10th October (the seventh day after operation), the temperature was normal and the pulse 136. At this stage some fæcal discharge oozed from the wound, and at the same time

signs of pneumonia developed. The child sank and died on the 13th October, three days later.

CASE V.—Ileo-cæcal intussusception in a child aged 6 months—operation after 12 hours—recovery.

A. C., a male child, aged 6 months, was sent to the Aberdeen Royal Infirmary by Dr Ogston, Rosemount, at 10 P.M. on the 13th January 1903. It had been perfectly well until about 11 A.M. of the same day, when vomiting of a bilious character and diarrhœa began. At first the stools were natural in colour, but soon became tinged with blood. On admission the child was pale and collapsed, the temperature being 97.6° F., and the pulse 130 to 140. There was no abdominal distension, no apparent tenderness, no tumour palpable, and nothing to be felt per rectum. Very soon after admission a fair quantity of blood and mucus was discharged per anum, but the child was perfectly quiet and had no paroxysmal attacks of pain.

Operation was performed at 11 P.M., 12 hours after the onset of the trouble. The abdominal cavity was opened by a median incision reaching from the umbilicus to the pubes, and an ileo-cæcal intussusception, 4 inches in length, found lying well under the costal arch on the left side near the spleen. By grasping and squeezing the tumour with one hand, and slightly pulling on the intussusceptum with the other, reduction was effected. In spite of the utmost care during the manipulation, the peritoneum of the intussuscipiens gave way slightly, but on account of the thinned-out condition of the bowel, it was deemed inadvisable to stitch it. The intussusceptum was much swollen and œdematous, especially the cæcum and adjacent part of the ileum; not only so, but the bowel was much discoloured in patches, varying in hue from a dark purple to a cherry colour. The intestines, which had prolapsed, were with difficulty replaced, and the abdomen stitched up. Throughout the operation a continuous stream of warm saline solution was kept playing on the intestines.

After-treatment.—The child, on being put to bed, was kept warm by hot bottles, and ℥x. of brandy in a little sweetened water given every hour, and ℥i. of Liq. Strychninæ every 3 hours. Also warm normal saline solution, in quan-

tities varying from 3 to 6 ounces, was thrown up the rectum every 3 hours. At first these injections were returned slightly blood-stained, but soon were retained.

On the 14th January, at 7 A.M., the morning after admission, as there had been no post-operative vomiting, a little diluted milk was given and repeated at intervals, and during the day the hourly administration of brandy was continued, but the drop doses of Liq. Strychninæ were given every four hours. In the evening ½ gr. of calomel was administered.

On January 15th the diluted milk was stopped entirely, as also was the strychnine, and as the child's mother was present and it was being suckled, breast feeding was relied on entirely after this. No motion of the bowels had resulted from the calomel of the previous evening, so it was repeated every four hours, and after the third dose the bowels moved, the stools being small but natural in colour. The saline enemata were stopped.

January 16.—Up to 1 P.M. the bowels had moved in all four times and were natural in colour. The temperature since operation had remained normal except on two occasions, when it reached 100.5° and 101.5° respectively.

January 18.—The general condition was considerably improved. Besides its mother's milk it still continued to have ℥x. of brandy in sweetened water hourly. No abdominal distension was present, and the bowels moved on an average twice daily. It slept a good deal.

January 24.—Nothing eventful had occurred since January 18th in the progress of the case. The stitches were removed from the abdominal wound and a collodion dressing applied.

The child was ultimately discharged from hospital well, and when last seen was in good health.

CASE VI.—Ileo-cæcal intussusception in a child aged 9 months—operation after 12 hours—recovery.

G. T. L., a male child aged 9 months, was sent to the Royal Infirmary, Aberdeen, on May 29, 1903, by Dr Ogston, Rosemount. At midnight he began to scream, evidently from pain, and this was soon followed by vomiting and the discharge of blood-stained mucus from the rectum. These symptoms continued during the night, and when he was seen by Dr

Ogston early in the forenoon he looked very ill and collapsed and a distinct tumour could be felt in the abdomen, which was perfectly flaccid.

Operation was performed between 11 and 12 A.M. about 12 hours after the onset of symptoms. The abdomen was opened in the median line below the umbilicus, and an ileo-cæcal intussusception found. Reduction was effected by gently squeezing the mass with the right hand while the left hand guided out the intussusceptum by gentle traction. The intussusceptum, especially in the neighbourhood of the cæcum and appendix, was considerably darkened and œdematous, but the consistence and texture of the coats of the bowel were good. The abdomen was thereafter closed. The temperature was elevated for two days after operation, but was afterwards consistently sub-normal. His pulse also from being 160 fell rapidly to 110 or thereby. Small saline enemata containing brandy were given at intervals for the first 24 hours, and very soon, as he was being suckled, his mother undertook the feeding. He was discharged from hospital soundly healed and well, exactly a fortnight after operation.

CASE VII.—Ileo-cæcal intussusception in a child aged 5 months—operation after 15½ hours—recovery.

C. G., a male child aged 5 months, was sent by Dr Cameron, Inverurie, at midnight on the 7th September 1903, with symptoms of intussusception which had existed since 11 A.M. of that day. The child looked collapsed, its temperature was 100° F., and its pulse 140, and stools containing blood and mucus were being passed at frequent intervals. The abdomen was quite soft, and a rounded tumour could be felt in the umbilical region.

At 2.30 A.M. on September 8th, *i.e.* 15½ hours after the onset of the illness, the abdomen was opened and an ileo-cæcal intussusception from 6 to 8 inches long found and reduced without much difficulty. No adhesions had formed, but the cæcum, appendix, and adjacent ileum were somewhat œdematous, swollen, and discoloured. During the operation a stream of sterile salt solution slightly above body temperature was kept playing on the protruded intestines. The abdomen was closed by three layers of sutures. The after-treatment

was conducted on much the same lines as in Case No. V., suckling by the mother being commenced within 12 hours of the operation. The bowels moved well the day following operation, and did so daily with the frequency natural to its age. The temperature in 24 hours was normal and remained so. Recovery was uninterrupted.

CASE VIII.—Ileo-cæcal intussusception in a child aged 15 months—operation after 10 hours—recovery.

H. G., aged 15 months, began to suffer from diarrhœa on May 31, 1905. This continued until 6.30 A.M. on June 4th, when in addition vomiting set in. At 11.30 A.M. of the same day blood and mucus appeared in the stools. He did not appear to be in much pain, but when he discharged blood and mucus from the rectum he cried a little. He was sent to the Aberdeen Royal Infirmary by Dr Bruce, Cults, on the afternoon of June 4th. There his condition was found to be as follows:—He was a stout, well-nourished child. His pulse was 120 and intermittent, and his temperature 97° F. The abdomen was soft and flaccid, and a distinct sausage-shaped tumour could be felt in the left iliac region.

Operation was performed at 4.15 P.M. on the 4th June, about ten hours after vomiting commenced. The abdomen was opened by a small incision in the median line, and an ileo-cæcal intussusception was found lying in the left lower abdomen and reduced without difficulty. The bowel, especially at the ileo-cæcal junction, was congested, œdematous, and swollen, but its condition was quite good. The abdominal wall was closed in three layers.

Small saline enemata, containing ℥xx. of brandy, were administered every three hours until the forenoon of the 6th June, and all were retained except the first one, which came away with some blood and mucus. No vomiting occurred, and nourishment (milk and water) was commenced by the mouth two hours after operation, and was retained from the first. The bowels moved on the evening of the 5th June, the stool being dark in colour. After this the motions were of quite good colour and consistence, and occurred at intervals natural to his age. His temperature on one occasion reached

100° F., but otherwise remained normal throughout. The stitches were removed on the tenth day, and he was discharged quite well on the 16th June, twelve days after operation.

Remarks.—Working, as the writer does, in a hospital which is for the treatment mostly of adult patients, it has not been his lot to meet with a large number of cases of intussusception, and it would therefore be illogical from a rather limited experience to lay down rules for future guidance in the diagnosis and treatment of this dangerous malady. The most that can be done legitimately under such circumstances is to give the impressions which force themselves on the mind during a review of one's cases. Fortunately the diagnosis is seldom attended with difficulty, the tenesmus and discharge of blood-stained mucus from the rectum, especially if combined, as is generally the case, with the presence of an abdominal tumour, make an unmistakable clinical picture. A tumour is not always palpable, however, as is illustrated by case No. V., where the intussusception lay under cover of the left costal arch near the spleen and thus escaped detection. Neither can correct inferences be drawn from the situation of the swelling as to the variety of the disease, for in several of the ileo-cæcal cases recorded the tumour lay in a region quite away from the neighbourhood of the cæcum.

The treatment seems to the writer to be purely operative, for if his experience has impressed upon him one thing more than another it is the futility of attempts at reduction by air or water. Only when the whole tumour or a good part of it was actually grasped in the hand and squeezing applied was it possible to undo the invagination. Moreover, apart altogether from the well-known danger attending distension, such is the frequent mobility of intussusception that the effect of this form of treatment may be to displace the swelling from an accessible region of the abdomen to one that is quite beyond the reach of palpation, and thus the surgeon may be deluded into the belief that he has relieved the trouble. In order to avoid prolapse of the intestines during operation it is recommended to make the incision in the abdominal wall sufficient to admit only a couple of fingers. But it is by no means always an easy matter to deliver an intussusception through such a limited opening, and it is necessary sometimes to en-

large the incision. In this case the intestines almost certainly prolapse, which well illustrates a frequent experience in abdominal surgery, namely, how easy a thing it is to open the abdominal cavity and how difficult it may be to close it.

The after-treatment adopted in most of the cases has been given in detail in Case No. V., and in this connection it has seemed to us of prime importance that the natural food of the infant should be resorted to as early as possible after operation. Thus in the case of children at the breast the mother has always been admitted with the child, and suckling commenced very soon, a procedure favoured by the frequent absence of post-operative vomiting.

Like all other acute diseases of the abdomen the shorter the interval elapsing between the onset of intussusception and the operation the more favourable the prognosis and the increasing tendency to submit these cases as soon as recognised to surgical treatment renders it highly probable that the post-operative mortality will go on decreasing. Indeed there is growing evidence of this in the more recently published cases. To rely on nature, as was done in Case No. I., probably very properly at that time, is now an untenable position.

Note.—Since writing the above it has been the writer's privilege, through the kindness of the Editors, to read the proof of the admirable monograph by Dr Dunbar. His strong and able advocacy of laparotomy in the treatment of intussusception is supported by every argument of reason and experience. The dimpling in the after-coming cæcal pouch to which he draws attention has certainly been observed in more than one of the writer's ileo-cæcal cases. It is of considerable interest to find that the after treatment detailed corresponds very closely to that practised independently in the writer's cases. In view of the disturbance often caused by artificial feeding it may be worth while reiterating what has been said above, namely, that it seems advisable in all cases of children at the breast to admit the mother as well, and to commence suckling as soon as possible after operation.

ON INTUSSUSCEPTION

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THE growth of special hospitals, and the separation of sick children from adults, must be held accountable to a great extent for the impression that intussusception is a prerogative of infancy. There is no denying the fact, which my own small experience confirms, that intussusception is far more common in infants and children than in adults and old age. Its very rarity among adults constitutes a pitfall to the practitioner, and makes its recognition less probable, and a life lost in infancy from erroneous or delayed diagnosis is nothing to the loss of an adult life with all its responsibilities and obligations. But though intussusception may occur at any age, it must be to those who have access to many cases, that is, to those who have charge of hospitals for children, that we must look for information concerning this condition, for they command a supply of material unattainable among adults. An individual experience of intussusception among children may be very considerable, among adults it cannot be, and the value of a collective investigation of intussusception must be much more valuable if it include the whole range of life than if it be confined to infancy.

In the following experience of twenty cases of intussusception, the incidence was equal in the sexes. In thirteen patients the age was under one year. One was four months old, three were five months, two were aged six months, three were seven months, one was eight months, and three were nine months old. Of the remaining seven patients, five were children aged respectively one year and seven months, two years, three years, five years, and nine years; and of the others, one was a young adult aged eighteen, and the other a female of sixty-one years.

In only six there was a history of a preceding illness. Thus in one infant there was a history of intestinal catarrh, in another of constipation, while in a third a gastro-intestinal

disturbance apparently had existed, and in a fourth there was a history of diarrhœa. In a girl of nine years there was a history of previous colic for a week, though, as a coincidence, the acute attack came on shortly after a kick on the abdomen (Case 18); and in a youth of eighteen years a history of constipation with previous attacks of pain suggested that a chronic may have preceded the acute intussusception. In no less than 70 per cent. no previous illness could be traced.

The symptoms of intussusception are pain, constipation, vomiting, the passage of blood, and the presence of a tumour. Though the first of these symptoms is the earliest, and from the patient's point of view the most urgent, it is of doubtful importance alone, because during infancy colic is so common, and it is difficult to estimate the severity and frequency of the pain. Constipation is always present, though the least reliable of the objective signs. The onset of intussusception may be heralded by a wave of peristalsis below the obstruction, resulting in a false security as to the patency of the intestinal canal, and the subsequent bloody evacuations may by the ignorant be construed into diarrhœa. Constipation is the result of the intussusception, of the enteritis, or of some functional disorder, but I do not think that it can be logically claimed as a cause of intussusception, for then the colic variety of the disease would be more common than it is. Vomiting varies much in onset, severity, and character in intussusception. Sometimes it occurs at the very commencement of the trouble, and as a rule is present in the early stages. After the stomach has been emptied, the vomited matter becomes bilious and green, and later assumes an "enteric" character, or worse still, becomes bloody or black.

The passage of blood by the rectum seems to me to be *the* symptom on which most general practitioners of medicine form their diagnosis, and with its appearance surgical aid is sought. Unfortunately bleeding from the bowel is neither a constant nor invariable occurrence, nor is it always an early one, and he who waits till bleeding sets in will surely find now and again that he has given away the child's chances by his delay (Case 7). With some or all of these symptoms the presence of a tumour would warrant operation. To my mind colic, prolonged, recurring, and not yielding to ordinary

treatment, would justify the administration of an anæsthetic and palpation of the abdomen in search of a tumour.

In no early case have I failed to find a tumour, but if the condition has gone on so long that there be marked abdominal distension, it may be difficult or impossible to distinguish. The tumour varies much in size, but its elongated form is most constant. It is somewhat firm to the touch, often slightly curved from traction on the mesentery, and as a rule exceedingly movable. The site of the tumour varies, and cannot in the least be relied upon to indicate the variety of intussusception in any given case. One would expect the tumour of an enteric intussusception to be in any part of the abdomen, yet in the only case in which I verified its composition by cœliotomy it lay midway between the right iliac spine and the umbilicus (Case 6). One would expect a colic intussusception to have its tumour in the upper part of the abdomen or in the left flank, and this I found to be the case (Cases 16 and 18). But one would scarcely expect the ileo-cæcal variety of tumour to have such an uncertainty of position as I found in my cases. Thus it was found to be "crossing the abdomen from the right iliac fossa" (Case 7), "in the right umbilical area" (Cases 8 and 10), "in the right lumbar region" (Case 14), "in the middle line below the umbilicus" (Case 12), "to the left of the umbilicus" (Case 9), "in the left iliac fossa" (Case 13), and "in the left lumbar and iliac regions" (Case 17). In the ileo-colic variety the tumour was in one case "to the right of the umbilicus," and in another, "in the right iliac region." In cases reduced without a cœliotomy the part involved remains uncertain.

The variety of the intussusception present in five of my cases was not ascertained, no inspection of the bowel being made, as four of the patients recovered without any cutting operation, and one child died after the parents had forbidden interference. The ileo-cæcal variety was present nine times. The average age of these patients was just eight months, the lowest age being four and the highest nineteen months. The enteric variety occurred twice, once in a child of five months and once in a youth of eighteen years. The ileo-colic variety was found in two patients, aged respectively two and sixty-one years, and in the younger the ileo-colic which

seemed to have been the primary condition, had superadded to it an ileo-cæcal forming the so-called "mixed" intussusception. Finally in two cases the variety was colic, and in both the transverse was intussuscepted into the descending colon. It is striking that among the infants the variety was almost uniformly ileo-cæcal, while other forms were the rule among the older children, youths and adults.

The treatment of intussusception is operation. One sometimes hears, though rarely, of a child or adult who after an unusually severe illness has passed per anum a slough of bowel, and my experience is that such an occurrence is not incompatible with a prolongation of healthy life, but the safety of modern surgical intervention now makes deliberate procrastination culpable. The subjoined table of my cases appears to show that I do not recommend invariable recourse to the knife. Cœliotomy is always to be preferred, provided surroundings and circumstances permit. In an early intussusception where the tumour is of moderate size, manipulation alone or combined with inversion with or without inflation is sufficient to cure a proportion of patients. Too long a time must not be spent over this performance, nor must the manipulation be severe. We all admit the danger of overdoing taxis in the treatment of strangulated hernia, but we allow that it is the first and safest method if judiciously applied, and so it is with intussusception with this advantage, that reduction, which merely relieves the strangulation of the hernia, finally cures the intussusception It requires no special skill or teaching to carry out this method, and therefore no excuse for any delay. The handiest instrument for blowing air into the bowel is a bicycle tyre inflator. The right index is introduced along with the tube from the pump into the rectum of the anæsthetised patient. The buttocks are grasped firmly with the right hand to prevent the escape of air. The bowel is then slowly inflated while the tumour is manipulated between the right index in the rectum and the left hand on the abdomen. If this does not succeed, inversion is added and the manipulation continued, and if success is to follow the tumour gradually disappears, often with an audible click or gurgle. The inflation is not done with the intention of filling the colon so full that the air will force the intussusceptum out, but merely to steady the colon to some extent while

manipulation and inversion are carried out, and I think that the futile endeavours of the colon to expel the air may set up an antiperistalis which would undoubtedly be useful in helping reduction. To exclude this method from text-books would be to condemn to inactivity those who meet with intussusception where a properly equipped hospital and sufficiently skilled assistance are not available.

Should the treatment by manipulation fail, or be inadvisable, no time should be lost in opening the abdomen. Whether this be done by a median cœliotomy or a laparotomy must depend on the circumstances of the case, but the tumour is investigated and if possible delivered from the abdomen. Reduction is then attempted. One hand grasps the intussuscepting layer lightly but firmly enough to prevent over-distension and possible rupture of the peritoneal coat, while with the other hand slow and increasingly firm pressure is exerted on the apex of the intussusceptum, and no attempt must be made to effect the reduction by traction lest the bowel be injured. The intussusceptum, especially towards its apex, is congested, and often so infiltrated with inflammatory products as to be almost cartilaginous in its firmness, and it is marvellous how soon and completely after reduction these disappear and the bowel resumes its normal naked-eye appearances. If reduction on account of adhesions or ulceration of the bowel cannot be carried out, recourse must be had to some modification of enterectomy or anastomosis, but the gravity of the prognosis is thereby very seriously increased.

The after-treatment has for its object the attainment of rest for the injured bowel, rest for the exhausted patient, and the replacement of the fluid lost by the vomiting, sweating, and bleeding. The first and second of these are attained at the same time by the administration of an opiate after the patient is returned to bed. This must be used with extreme caution in the case of infants, but is generally required. If the peristalsis be arrested or diminished till the bowel has regained its normal condition, as it does so rapidly, there is less likelihood of the intussusception being reproduced. If the exhaustion be marked, the administration of saline by the rectum or subcutaneously in not too large a quantity repeated often during the first twenty-four hours is desirable,

but along with this, especially in infants, sleep must be obtained. An infant who, after the operation, does not sleep, but remains more or less actively restless during the first twelve hours, is not likely to do well. If sleep be obtained, and the loss of fluid has been made up if required, it is probable that the bowels will move within the first day; but if they do not, a dose of castor oil should be administered, and this may with advantage be combined with opium.

Of my twenty cases here reported, ten died. Of those fatal cases, two had been ill with all the classical symptoms for two days (14 and 15), and three had been ill for three days (5, 7, and 18); that is to say, that half had been ill so long that recovery after operation might be regarded as hopeless from the first. Death seemed to be due in most cases to exhaustion, though in one (Case 18) it appeared to be the result of bowel paralysis. All experience goes to show that the earlier intussusception is recognised and treated, the more satisfactory the result, for in the early stages the operation is comparatively simple. For such successes as we may show can be said: "Not unto us, not unto us (the surgeons) give the praise, but unto those general practitioners who in the duties of their profession recognise the condition of intussusception early enough to make its treatment a certain success."

Résumé of Cases.

CASE I. Male, æt. 7 months, stout, healthy child. On the previous day had a greenish stool, and had a dose of castor oil administered. Towards evening he had slight griping pains, and had some alkaline medicine. This did not relieve, and when seen at 3 A.M. he was crying with spasmodic pains, a considerable quantity of blood had been passed, and there was a sausage-shaped tumour across the lower abdomen. The doctor thought that two large enemata had diminished the tumour. Under chloroform, about fourteen hours after the onset, a softish, oval tumour, the size of a plum, could be felt and could be pushed upwards under the liver and down to the pelvic brim. Inflation and massage produced no effect until accompanied by inversion (the infant being held up by the feet), when with a slight gurgling sound the tumour disappeared. A normal motion was passed some hours later.

No.	Sex.	Age.	Preceding illness.	Duration before Operation.	Site of Tumour.	Operation.	Variety.	Result.	Duration of life after Operation.
1	M.	7 mo.	Intestinal catarrh	14 hrs.	Across lower abdomen.	Inflation, manipulation and inversion	?	Rec.	
2	F.	6 mo.	None	18 hrs.	Above sacral promontory	do.	?	Rec.	
3	M.	7 mo.	None	12 hrs.	Above umbilicus	do.	?	Rec.	
4	F.	9 mo.	None	?	Under liver.	Manipulation and inversion	?	Rec.	
5	F.	6 mo.	Unsuitable diet	3 days	Middle of lower abdomen	Not permitted	?	Died	?
6	F.	5 mo.	Gastro-enteritis	48 hrs.	Between right iliac spine and umbilicus	Cœliotomy and reduction	Enteric	Died	11 hrs.
7	M.	9 mo.	None	3 days	Across abdomen form right iliac fossa	do.	Ileo-cæcal	Died	52 hrs.
8	F.	8 mo.	None	16 hrs.	Right umbilical area	Laparotomy (lin. semilunaris) and reduction	Ileo-cæcal	Rec.	
9	M.	7 mo.	None	24 hrs.	Left of umbilicus	Cœliotomy and reduction	Ileo-cæcal	Rec.	
10	M.	9 mo.	None	24 hrs.	Right of umbilicus	do.	Ileo-cæcal	Rec.	
11	F.	5 mo.	None	30 hrs.	Left iliac fossa to costal margin	Excision	Ileo-cæcal	Died	15 hrs.
12	M.	4 mo.	Diarrhœa	38 hrs.	Middle of lower abdomen	Cœliotomy and reduction	Ileo-cæcal	Rec.	
13	M.	5 mo.	None	21 hrs.	Left iliac fossa	do.	Ileo-cæcal	Died	14 hrs.
14	M.	19 mo.	None	2 days	Right lumbar region	Excision	Ileo-cæcal	Died	20 hrs.
15	F.	2 yrs.	None	2 days	Right of umbilicus	Cœliotomy and reduction	Ileo-colic (mixed)	Died	15 hrs.
16	F.	3 yrs.	None	2 days	Left abdomen	do.	Colic	Died	16 hrs.
17	M.	5 yrs.	None	6 hrs.	Left lumbar and iliac regions	do.	Ileo-cæcal	Rec.	
18	F.	9 yrs.	Colic (one week)	3 days	?	do.	Colic	Died	6th day
19	M.	18 yrs.	Constipation and previous attacks of pain	5 days	?	Excision	Enteric	Died	On table
20	F.	61 yrs.	None	52 hrs.	Right iliac fossa	Cœliotomy and reduction	Ileo-colic	Rec.	

CASE II. Female, æt. 6 months, who had been quite well, and whose bowels had moved naturally the previous day, was admitted to hospital with a history of vomiting and the passing of blood for eighteen hours. Under chloroform a small, soft, elastic, freely movable tumour was felt in the middle line at the pelvic brim. It disappeared on inflation and manipulation with inversion, and almost immediately afterwards the bowels moved naturally.

CASE III. Male, æt. 7 months, had had pain in the abdomen with passage of blood for about twelve hours. Under chloroform a soft elongated tumour could be felt above the umbilicus. On manipulation, inflation, and inversion this tumour, with some gurgling, disappeared. Within the following twenty-four hours the bowels moved three times, the first motion containing blood and the others being normal.

CASE IV. Female, æt. 9 months, previously in perfect health, awoke one night with apparently sudden and severe pain and cried much. Next day, vomited once and there was no movement of the bowels. On the following day she vomited again and had pain at intervals. On the third day she vomited several times and an enema brought away a teacupful of blood. It seems probable that it was about this time that the intussusception occurred and the previous pains had been of a colicy nature, for she was now in obvious pain, wringing her hands as infants do, and moving her legs and toes and crying. Under chloroform a small elongated tumour could be brought down from under the liver to the pelvic brim. With manipulation and inversion this disappeared. The child had a fair night, and next morning a dark motion (bismuth had been given) containing a little blood passed, and there was no further trouble.

CASE V. Female, æt. 6 months, had been getting varied diet, and not such as a child of her age should. The bowels had not been moved for two days, when she began to cry with severe pain in the abdomen, with vomiting and the passing of blood by the bowel three days ago. There was a small, elastic, freely movable tumour to be felt in the middle of the

lower abdomen. The parents refused to allow any operation and the child died on the following day.

CASE VI. Female, æt. 5 months, had been drowsy and out of sorts three days ago, and on the second evening had had a dose of castor oil administered. She had a restless night thereafter, but the bowels moved in the morning. There was blood in the motion, abdominal pain increased, and vomiting commenced. These symptoms had continued unabated for twenty-four hours, when, under chloroform, a distinct tumour was felt midway between the iliac right and the umbilicus. With inflation, manipulation, and inversion this tumour apparently disappeared. During the night, however, all the symptoms recurred, and next morning, though the child was decidedly collapsed, cœliotomy was performed and an easily reduced enteric intussusception discovered. Its appearance did not suggest a long duration, and the operation was followed by marked relief, but later the pain seemed to recur, though there was no more vomiting or bleeding, and eleven and a half hours after the cœliotomy the child died of exhaustion.

CASE VII. Male, æt. 9 months, had three days previously been seized with abdominal pain accompanied by vomiting. On the day after the onset castor oil was administered and the bowels were said to have been "well moved but black-looking." On the following day more castor oil was given, but with no result, and at night the child had a "powder" to ease the pain, which it had done very ineffectually. On the morning of admission to hospital the child had had an enema, and the resulting motion was bloody and intussusception was suspected. Under chloroform a tumour was found crossing the abdomen from the right iliac fossa. Cœliotomy showed a very large ileo-cæcal intussusception, the apex of the intussusceptum being in the sigmoid. With a little care this was reduced. In spite of a little nepenthe the child had a restless night, though there was no more vomiting. The bowels moved, a black motion, twelve hours after the operation, and again an hour after that, but the child sank and died fifty-two hours after the operation. On post-mortem examination everything appeared normal, and there was no sign of inflammation nor of the induration and

infiltration which had been so striking in the affected part of the bowel at the operation.

CASE VIII. Female, æt. 8 months, had been constipated for three days before she had an aperient, after which she vomited several times and had great abdominal pain. Next morning the bowels had moved slightly, with blood. Under chloroform a tumour was felt in the right umbilical area. Inflation and inversion, with massage, was unsuccessfully tried, and the abdomen was then opened in the right semi-lunar line. An ileo-cæcal intussusception was found, which was easily reduced, and after castor oil twelve hours later the bowels moved satisfactorily.

CASE IX. Male, æt. 7 months, took ill the evening before admission with vomiting and abdominal pain. He had a fair night, though he vomited twice and seemed to have pain when awake, and early in the morning passed blood by the rectum. Under chloroform a sausage-shaped tumour, about three inches long, was felt to the left of the umbilicus. Through a median incision an ileo-cæcal intussusception was found. The involved bowel was much congested and dark bluish red in colour, and considerable difficulty was experienced in effecting reduction. Next morning the bowels moved, blood stained, and for the two succeeding days the infant had diarrhœa.

CASE X. Male, æt. 9 months, suddenly became cross, and an hour later vomited green fluid. A "powder" was administered and a "pink" motion was passed. He slept badly all night, and in the early morning began vomiting again. At intervals two enemata were given and pink fluid passed. Thirty hours after onset my house-surgeon noted: "the child looks anything but ill, and fell asleep immediately he was put to bed; no boarding of the muscles of the abdomen, no flexion of the thighs, and seems to have no abdominal tenderness." Under chloroform a tumour was felt to the right of the umbilicus, and a cœliotomy exposed an ileo-cæcal intussusception which was easily reduced. The bowels moved next morning, a loose green motion containing a little mucus, but no blood.

CASE XI. Female, æt. 5 months, took ill with sudden sickness, vomiting, and pain. Ten hours later passed "a good deal" of blood by the bowel, and this continued more slightly at intervals. The child looked very ill thirty hours after the onset, and under chloroform a firm tumour could be felt from the left iliac fossa upwards to the costal margin. The right iliac fossa felt empty. There was a thin bloody oozing from the anus. Temp. 97°, pulse 120, resp. 82. Cœliotomy disclosed a large ileo-cæcal intussusception which had reached the sigmoid. The bowel was gangrenous and was excised. The child died fifteen hours later.

CASE XII. Male, æt. 4 months, a fine healthy child, had for a week before intussusception had diarrhœa, with green stools. Early in the morning he wakened suddenly, screaming with pain and drawing up his legs. This continued, and he vomited all food, and on the morning of admission had passed blood several times. Under chloroform a tumour, the size and shape of one's thumb, was felt below the umbilicus in the middle line. Cœliotomy was done thirty-eight hours after the onset of the illness, and an ileo-cæcal intussusception was found and easily reduced.

CASE XIII. Male, æt. 5 months, a bottle-fed baby, took suddenly ill and screamed off and on all night. There had been no movement of the bowels, but blood had been passed since early morning. The child looked very ill and his eyes were sunken. Cœliotomy performed twenty-one hours after the onset demonstrated a considerable ileo-cæcal intussusception. There was some difficulty in reduction, and the peritoneal lining of the intussuscipiens tore a little Nepenthe was given (perhaps injudiciously) because the child was restless, and fourteen hours after the operation the child was found to have passed quietly away.

CASE XIV. Male, æt. 1 year 7 months, had been ill for two days with spasmodic abdominal pain, vomiting, and the passing of blood. He did not look particularly ill. A tumour was felt in the right lumbar region. A median cœliotomy, from the margin of the liver to the pubis, exposed a four

inch long ileo-cæcal intussusception, the bowel at the base of the intussusceptum being gangrenous. Excision of the bowel was done, but the child died next morning.

CASE XV. Female, æt. 2 years, was admitted to hospital with a history of constant vomiting during two and a half days. It came on suddenly, and consisted first of food, then of green fluid, and then became dark brown or black. Various medicines and enemata were given under medical advice on the following day, and a dark slimy motion resulted. No blood was noticed, and the child was said to have had no pain during the illness. On admission, temperature 101.4°, pulse 164, respirations 46. She lay in bed with her thighs drawn up, her face pale, and her eyes glassy and sunken, with dark rings round them. Her pupils were dilated, and she was a little restless, though allowing examination without any complaints of pain. She was drowsy, and every few minutes, quietly and without effort, she vomited a mouthful of dark brownish green fluid. There was an egg-shaped tumour to the right of the umbilicus, firm, freely movable, and slightly tender. Cœliotomy was performed, and a mixed variety of intussusception found. Apparently the primary intussusception had been of the ileo-colic variety, and then this with the ileo-cæcal region had been intussuscepted into the ascending colon. The reduction was easy, but the child died twenty-five hours after the operation.

CASE XVI. Female, æt. 3 years, suddenly during the night had been seized with severe abdominal pain, and was sick and vomiting all that day. There was blood in the vomit, and the bowels moved once and contained much blood. She was very ill and restless all the following night and day. About forty-eight hours after the onset a tumour could be felt in the left side of the abdomen, and a cœliotomy exhibited a considerable colic intussusception, the transverse being intussuscepted into the descending colon. It was easily reduced, but the child died sixteen hours later.

CASE XVII. Male, æt. 5 years. While at afternoon school he had been suddenly seized with abdominal pain,

and three hours later he had vomited and had passed a quantity of blood by the bowel. Two hours later he had vomited again. In the left lumbar and iliac regions a tumour was visible and easily palpable, freely movable and slightly tender on palpation. The abdomen was opened six hours after the onset, and a large cæcal intussusception was found and easily reduced, though the intussusceptum was fully five inches long.

CASE XVIII. Female, æt 9 years, was admitted to hospital with a history of bleeding from the bowel of three days' duration. For a week previous to that she had had abdominal pain but there had been no vomiting, and the bowels had been regular. Then she got a kick while at play, producing a slight abrasion in the right groin. An hour after that she had passed blood by the rectum, and this had been repeated frequently since without the admixture of fæcal matter. On the day following the injury vomiting began and she had retained nothing since. The night before admission she passed a teacupful of bright red blood. On admission her face looked "drawn" but she did not seem acutely ill, her colour was fresh and she lay comfortably in bed. The abdomen was retracted. Temperature 99°, pulse 88, respirations 24. The left rectus was more rigid than the right, and she complained of tenderness not amounting to pain in the left iliac fossa. Cœliotomy exposed a colic intussusception, the transverse being intussuscepted into the descending colon. Reduction was not difficult. After the operation she continued restless and the vomiting of fluid continued. This was accompanied later by increase in pulse rate, dryness of the tongue and abdominal distension. The latter symptom was relieved by the administration of saline cathartic in small doses frequently by the mouth, but the movement of the bowels consisted of the escape of fluid and flatus rather than any proper motion. Two days later she was unconscious, her complexion was livid, the pulse 140 and the extremities cold. She continued to vomit brown fluid, and on three occasions a thin dark fluid in some quantity escaped from the bowel. This condition continued till the sixth day after the operation, when she died. On post-mortem examination no peritonitis was found. The ascending colon was dis-

tended and there was a quantity of hard fæcal matter in the bowel down to the site of the intussusception. Beyond that, about ten inches of bowel were collapsed and empty, and the rectum contained a little fluid. It was apparent that the peristalsis, paralysed by the intussusception, had never been re-established.

CASE XIX. Male, æt. 18 years, was admitted to hospital complaining of pain in the abdomen of five days' duration. He had never been a strong lad, and three years previously had suffered from an axillary abscess (tuberculous?) A year ago he had had abdominal pain in the left iliac fossa for which he was one day in bed. About a month ago he had an attack of "piles" with a little bleeding when the bowels moved, but the "piles" disappeared after each movement (prolapse from straining?). He had not been off work with this, but had a little vomiting and some abdominal pain. Five days before admission, continuous pain began suddenly with exacerbations which kept him awake at night. The bowels had not moved for two days before that, but when the pain began he passed blood and had had frequent vomiting though he had had no food. Though exceedingly ill, on admission to hospital he was conscious and intelligent. The abdomen was enormously distended and tympanitic all over; the breathing entirely thoracic; the tongue dry and the skin dusky. He was very thirsty and his pulse was 112. On opening the abdomen an inflamed and gangrenous enteric intussusception was found, the small intestine above it being enormously dilated. Enterectomy was performed, but the patient died soon after the completion of the operation.

CASE XX. Female, æt. 61 years, had been seized suddenly with severe pain in the abdomen followed by rigidity of the muscles, vomiting, and no movement of the bowels. The pain was removed by repeated use of morphia, and on the following day after an enema a bloody motion had been passed. I operated 52 hours after the onset and easily reduced an ileo-colic intussusception. The absence of inflammatory symptoms and of congestion of the intussusceptum I attribute to the judicious use of morphia which held the peristalsis in check.

INTUSSUSCEPTION

By T. J. THYNE, M.B., F.R.C.P.

THERE is no disease of childhood, with the possible exception of osteomyelitis, which demands from the practitioner such prompt recognition as does intussusception. On his ability to form an accurate opinion based upon the early symptoms of this disease the life of his patient may depend, the operative measures necessary for its relief being as eminently successful if performed early as they are too frequently attended by disastrous results when a delay of forty-eight hours or more has resulted from hesitancy in diagnosis. It is the early symptoms of intussusception that are the important ones, and these in my experience are four in number: (1) Pain and vomiting; (2) bloody stools; (3) presence of tumour, and (4) symptoms of severe general shock.

The clinical picture is a striking one, and once seen is not readily forgotten. A perfectly strong child—and my cases have been in particularly strong children—is suddenly seized with *severe abdominal pain*, evidently paroxysmal, attended by *vomiting*, often apparently without effort. Tenesmus may or may not be an early symptom according to the more or less rapid invagination that has taken place, but generally there is a history of some *blood* having passed per anum, and if not, some will likely be found on the finger passed into the rectum. An examination of the abdomen, under chloroform if necessary, then almost invariably reveals *the presence of a tumour*, the position and size of which also depends on the amount of invaginated bowel; and it is of the highest importance to note that this characteristic tumour, which, if discovered, is diagnostic of the disease, appears within a few hours of the incidence of the attack.

Add to the above the no less important *symptoms of severe shock*, the pallor, the appearance of collapse, the prostration and muscular relaxation, and last, and by no means least, the usually subnormal temperature distinguishing the malady from the gastro-enteritis or ileo-colitis for which it is most readily mistaken, and there should be little difficulty in coming to a correct conclusion.

In my experience intussusception is a comparatively rare disease, for in twenty years of general practice I have only seen it five times in four patients. It is worth keeping in mind, the fact that one may, as I did, meet with an intussusception a second time in the same child. In the case I refer to, the second attack occurred about a year after the first one, and the mother, recognising the symptoms, had her baby seen to at once; it was operated on three hours after the seizure, and for the second time made a perfect recovery.

In considering the treatment of intussusception, my first case, and the only one that terminated fatally, was a grave warning to me of the danger of paltering with inflation, or the injection of fluids into the colon. Laparotomy was not practised so boldly in these days as now, and the patient, a strong healthy boy of ten months, was subjected to inflation. The tumour, which was palpable in the transverse colon, was thought to have disappeared after its use, but the next day the child rapidly sank and died, the process of disinvagination evidently not having been completed.

So, notwithstanding the fact that Holt, in his "Diseases of Children," says that "laparotomy is indicated as soon as a thorough trial of reduction by inflation or injection has been made without success," I feel convinced that there are two golden rules to follow in dealing with this disease, viz., make an early diagnosis, and then have the abdomen opened at the earliest possible moment.

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THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

"QUACKERY"

The Promotion Address to the Graduates of 1906

By Professor ANNANDALE

VICE-CHANCELLOR AND GRADUATES OF THE HOUR,—It has fallen to my lot for the third time to act as Promoter of the Medical Faculty at this Graduation ceremony, and in the name of my colleagues, and in the name of the University, I offer you very sincere congratulations. The University congratulates those distinguished gentlemen who have received the honorary degree, and she assures them that she is proud to have added their names to her list of honorary graduates. The University congratulates those of you who have received the highest degrees in medicine and surgery. Your return to take these higher degrees is very gratifying to my colleagues and myself, and the success of your examinations and the excellence of your theses prove that you are doing good work, and so assisting to maintain the credit of your Alma Mater. The University congratulates all others who have to-day graduated for the first time, and she expresses the earnest hope that you will be prosperous and successful in any work which you may be called upon to undertake. Long custom demands that the Promoter of the day should give an address. I confess I had some difficulty in selecting a subject on which to address you. At one time I thought some reminiscences connected with my long work in the University and in my profession might interest you, but it also occurred to me that reminiscences are not usually made

public until one has retired from active work, or is dead. As I am not giving up active work yet, and am still alive, I have decided to postpone this subject in the meantime. The subject I have chosen is "Quackery," otherwise Humbug. As is well known, humbug exists more or less in all professions and trades, but naturally I confine my remarks on this occasion to quackery as it exists in connection with the treatment of disease and injury. It is not easy to determine when internal remedies were first used by early man, and two theories have been suggested to explain what led to the use of such remedies. One theory is that early man feeling an internal pain or discomfort, accidentally took some plant, flower, or other substance, and finding relief from it, this remedy became a standard means for treating disease. The other theory is that man took suggestions from some of the lower animals, who are known to take certain plants, leaves, grass, or other things when feeling unwell. Pliny accounts for the discovery of venesection in the following fable:— "The hippopotamus having become too fat and unwieldy through over-eating, was seen to thrust his nose on to a sharp-pointed reed, and when he had drawn sufficient blood, he closed the wound with clay." One fact is, however, undoubted, and it is, that surgery is more ancient than medicine. Laurence Heister, an old and distinguished surgeon, in a valuable and wonderfully illustrated work on Surgery which was published in the year 1710, puts this so well that I give the following quotation from the Introduction to his book:— "Though, to say truth, I cannot help believing with Celsus and others that surgery is more ancient than any other branch of physic, and near coeval with mankind, and therefore the true parent of medicine. The nearer mankind was to its first original, at so much the greater distance were they from luxury and debauchery, and of consequence so much the farther removed from internal diseases; but on the other hand, even in the earliest times, men were liable to external injuries, which required the assistance of a surgeon's hands; for who in those days was secure from falling, from fractures of the bones, from the bites of wild beasts, or from the wounds of an open or insidious enemy?" Heister further writes that Nature gradually taught man to treat such cases,

and by additional experience more successful treatment became established.

THE ANCIENT SURGEONS.

It seems most likely that the first special treatment of disease was due to the ancient Egyptians or Chaldeans. From them the Grecians obtained their knowledge, and the famous Greek Centaur, Cheiron, was probably the first to instruct his countrymen; and his distinguished pupil, Æsculapius, has the credit of making medicine a distinct profession. Æsculapius, who was a student in the year 1250 B.C., is said to have been the son of Apollo, and had among other children two sons, Podalirius and Machaon, who accompanied Agamemnon in his expedition to Troy. Æsculapius is related to have bestowed on these two sons the arts of Medicine and Surgery, and Arctinus writes:— "Nevertheless, he made one of the two more celebrated than the other. On one did he bestow the lighter hand, that he might draw missiles from the flesh, and sew up and heal wounds. But the other he endowed with greater precision of mind, so as to understand what cannot be seen, and to heal seemingly incurable disease." Æsculapius is reported to have been killed with a flash of lightning by Zeus, because he was too successful in his treatment, and Zeus explained that his reason for killing him was, that he feared men might gradually escape death altogether; and it has also been recorded that Pluto had complained that this medical treatment would too much diminish the number of the dead. It is not to be wondered at that the practice of medicine, even in the days of Æsculapius, was still in a very unsatisfactory condition, for the knowledge of anatomy and the functions of the various organs of the human body was very imperfect. Medicine also came under the influence of priestcraft, and the priests, unwilling to lose their power and financial control over the people, encouraged this connection. Divine powers were given to Æsculapius, and temples were erected in Rhodes, Cos, and other places, in which he was worshipped as the god of physic. His descendants followed his profession, and also that of priests in his temples. These temples became hospitals for sick people, and many resorted to them for relief. The treatment appears to have principally consisted of rites and ceremonies, together with

some attention to diet. In fact, it may be said that for many hundreds of years after the death of Æsculapius, the treatment of disease consisted principally of ceremonies, incantations, charms, magic, of external applications, and occasionally of sacrifices. A few drugs were probably in use during this time, but the pharmacopœia was certainly limited. In the year 460 B.C., Hippocrates, called the "Father of Medicine," was born at Cos. He was said to be descended from Æsculapius, and, through his mother, from Hercules, and he is generally considered to be the first and most distinguished physician and author, and he was, no doubt, the first to rescue medicine from superstition and the sophistries of philosophy. He was not only the father of medicine, but also the father of surgery. His writings show a marvellous knowledge of disease and injuries, and his treatment of them is founded upon sound principles, common sense, and great skill, which, considering the knowledge of the time, prove him to have been a man of truly remarkable genius. The history of medicine from its early days forms a most interesting and instructive study, and, if time permitted, one would be tempted to say more of it; but I must not forget that my subject is quackery.

Quackery in Olden Times.

It might be expected that as knowledge and civilization advanced, the treatment of disease and injury would have been relieved of much that was erroneous and absurd; but although great improvements gradually took place, quackery in many forms continued rampant, and, it is sincerely to be regretted, still remains so. A study of quackery and its various methods presents an extraordinary enlightenment as to human credulity, and to a calm observer the extent of such credulity in some of its forms almost approaches a condition of monomania or insanity. One explanation of this credulity is probably owing to the fact that now, and in all ages, there are, and have been, men and women with strong determination, unlimited self-assertion, and, in not a few instances, unscrupulous as regards principles, who dominate their fellow-creatures, and so exercise a power which may be for the good of the latter, but is too often used for selfish or base motives.

There is another explanation which I think all have a little sympathy with, namely, that when a diseased or painful condition is not relieved by ordinary remedies, or when it is very chronic or incurable, it is not unnatural for a patient or friends to seek a cure from any source or from many sources. This explanation, however, refers only to a limited number of cases. Many forms of quackery are thus successful as the result of quacks acting on the imagination of their victims and taking advantage of their credulity. Before speaking of the quackery of the present, let me mention some of the varieties of quackery which existed in former times. During the reigns of Edward the Sixth and Queens Mary and Elizabeth, there flourished a physician, named Buleyn, who was connected with the family of the unfortunate Anne Boleyn, one of the wives of Henry the Eighth. He suggested and used many different remedies, and among others prescribed a cure for a sick child, which consisted of a small young mouse, roasted. Another favourite remedy was a preparation of snails, and a third remedy, termed "A Precious Water," contained no less than thirty different ingredients. The cure of scrofula by the "King's Touch" was at its height in the reign of Charles the Second, although Edward the Confessor, who was a saint as well as a king, appears to have been the first to practise it. In a work on Surgery published in 1676, and dedicated to Charles the Second, by a sergeant-surgeon named Wiseman, reference is made to the success of this practice; but Wiseman evidently felt that other means were to be employed for this disease, and he enumerates a large number of such cases treated by himself by remedies, not by touch. It is rather amusing to read the excuse he gives for treating scrofula by other means than "the king's touch." He writes: "But since the infidelity of this fantastical age, and the want of opportunity of others, doth deprive them of this easy and short remedy, and since it is not necessary that a disease that is cured by miracle should be remediable by no rules of art, I think it will not be amiss if I do here give an account of what Nature and art have supplied towards the relief of mankind." Queen Anne suffered from weak eyes and had a passion for quack oculists. Two of her favourite oculists were William Reade, who was an uneducated tailor and could not even read, and Roger Grant, a cobbler and

Anabaptist preacher. The former was knighted, and hence the following verse :—

> "Her Majesty sure was in a surprise,
> Or else was very shortsighted,
> When a tinker was sworn to look after her eyes,
> And the mountebank Reade was knighted."

Mesmer, a German physician, flourished in 1776. He first advocated the influence of the stars. Some years after, he recommended the use of the lodestone, and lastly he preached the use of animal magnetism and practised it, with the result that his house was crowded with patients, and one of his pupils is said to have cleared £100,000 by following his practice. His theory was that animal magnetism depended upon a magnetic fluid, and his treatment consisted in certain passes or touches. He even declared that actual touch with a patient was not required, for if a patient on one side of a river put a stick into the water and held it there, and Mesmer put another stick into the water on the other side, a cure was effected. These practices of Mesmer attracted much attention in France, and the king, in 1784, appointed a commission composed of the members of the Faculty of Physicians and of the Royal Academy of Science to examine into this subject. These gentlemen made and witnessed many experiments, and as a result of their investigations they reported that the so-called animal magnetic fluid was capable of being perceived by none of our senses, and had no action upon themselves or subjects of their experiments; and further, that the fluid had no existence, and consequently had no use, and that this practice of Mesmer may even be hurtful by unduly exciting the nervous system.

Some Noted "Quacks."

In 1782 a noted quack, named Dr Kotterfelto, flourished. He travelled the country in a large caravan containing a large number of black cats, but his career fortunately after a time terminated, and he was condemned as a rogue and vagabond by the Mayor of Shrewsbury. A notorious quack named Dr Graham combined the treatment of disease with religion, and some of his writings are really blasphemous. Among

other works he published what he designated "Graham's Paraphrase on Our Lord's Prayer." He designated himself as "President of the Council of Health," "Sole Proprietor and Principal Director of the Temple of Health in Pall Mall, near the King's Palace, London." He gives the following among the list of his remedies: "Imperial Pills," "Anti-Scorbutic Essence," "Imperial Amber," "Pearl Essence," "Ætherial Ambrosial Quintessence of Gold and Sundew," and he dwells on the marvellous success of these different remedies. He sold an "Elixir of Life," which, according to his account, had the property of causing a person to live as long as he liked. He charged £1000, paid in advance, for this remedy, and it is said to have been purchased by more than one individual. He further made use of music, and in his Temple of Health the organ, the harmonica, the celestina, accompanied with flutes, clarionets, and the finest vocal performers and various coloured lights, were employed to assist his other remedies. He was also a poet and composer of recitations, and I quote a short portion of one of his productions: "Hail, vital air, ætherial magnetic magic, hail: hail, harmony, music divine, thrice hail. The soul is love, joy, peace, and health. Hail, wondrous combination, heavenly unity in majesty and mystery combined." The famous Lady Hamilton, the friend of our great Nelson, was for a time an attraction in this temple, which was crowded with all classes of society. Another notorious quack who for a time flourished was a man named Perkins, who professed to cure by means of the touch of painted nails, which nails were made of various metals and could only be manufactured by himself. A cute member of the medical profession, however, made experiments unknown to this quack with lead pencils and pieces of painted wood, and obtained quite as good results—another example of the success of acting on the imagination. Again, there was a famous female quack named Mrs Mapp, who drove about in a carriage with four horses, and made regular professional visits to London. She was known as "Crazy Sally of Epsom." Although enormously fat, ugly, and often drunk, she was held in great esteem as a bone-setter, and was said to have performed so many cures that the town of Epsom offered her £100 to remain there one year. A notable and shameless blackguard was a man

named Taylor. He gave lectures on the eye, and his oration to the University of Oxford commenced as follows: "The eye, most illustrious of the muses, most learned Oxonians, whose fame I have heard celebrated in all parts of the globe —the eye, that most amazing, that stupendous, that comprehending, that incomprehensible, that miraculous organ— the eye is the proteus of the passions, the herald of the mind, the interpreter of the heart, and the window of the soul. The world was made for the eye, and the eye for the world. The eye is indefatigable. The eye is an angelic faculty. The eye in this respect is a female." The last quack I will at present refer to was a St John Long, who was the son of an Irish basket-maker. He was not a man of much education, but he had a good address and a certain cleverness. He at first devoted his attention to painting, and as an artist gave instruction in this subject; but finding that it brought in very little money, he suddenly acquired fame as a curer of disease. He took a large house in Harley Street, and soon persons of the highest rank flocked to his rooms to be treated by external application and by inhaling some mixture through a tube which was connected with a large mahogany case. The street was frequently blocked by the carriages of his patients, and he was received into the best society. He is said to have made £13,400 in one year. His career, however, was fortunately checked, owing to the death of more than one of his patients as a result of serious ulcerations caused by his applications. He was tried at the Old Bailey for manslaughter, but he got off with a fine of £250. Ladies of rank and many of his old patients appeared in court and gave strong evidence in his favour. Notwithstanding these fatal cases, and notwithstanding that the respectable papers, including the *Times*, *Chronicle*, *Herald*, *Lancet*, *Spectator*, *Standard*, *Globe*, *Blackwood*, and *Fraser*, condemned him, he still had many friends who continued to believe in him. He died at an early age of consumption. In an old number of the *Lancet* there is a story that Sir Francis Burdett had called on Mr St John Long to ask him if his liniment would give the Marquis of Anglesey a leg in place of the one lost at Waterloo. Long gave an encouraging answer, and the liniment was applied, with the result of producing one great toe.

Present-Day Credulity.

I have referred to these practitioners of quackery in order to illustrate credulity in connection with the treatment of disease. I would here remark that quacks have not been, nor even now are, confined to one sex or to one class. As I have already mentioned, former kings have employed touch to cure "scrofula," many so-called cases of which have probably been of a much more simple nature. King James the Fourth of Scotland was said to be a "cunning chirurgeon," and it was at the time stated that "none in his realm used this craft but would take his counsel in all their proceedings." An Earl of Derby was celebrated as a bone-setter, and so also was an Earl of Herfurth; another noble Lord's hobby was venesection, and several other men of rank were among fashionable quacks. Women quacks at one time seem to have predominated over male ones, but as I should like to encourage our lady medical graduates, I may tell them that in the year 1098 there was a famous lady physician and abbess named St Hildegard, who wrote a treatise on Materia Medica, and further, she was the first to suggest the enveloping in flour of nauseous medicines so as to make a sort of pancake, thus long anticipating the present use of wafers or cachets for this purpose. But now, what of the present day? Carlyle in his "Sartor Resartus" writes: "An epoch when puffing and quackery have reached a height unexampled in the annals of mankind." Dr John Brown writes: "Quackery and the love of being quacked are in human nature as weeds are in our fields." Some of the worst forms of quackery as practised formerly may not now exist, but it cannot be denied that quackery is still rampant in not a few forms. Our papers and magazines contain much that is interesting, instructive, and amusing, but not a few of them in their advertising sheets proclaim the advantages of quack proceedings and remedies, and from this it is quite evident that the advertisers must have a large number of clients in order to pay for the insertion of these illustrated and non-illustrated columns. It is only fair to say that one editor—he of *Truth*—deserves much credit for so successfully exposing, even at the risk of legal proceedings, the doings connected with some of the worst forms of quackery at present flourishing.

The Christian Scientists.

I have already referred to the fact that so-called faith cures and cures by acting on the imagination have been recorded from the earliest times. More recently a faith cure, under the name of "Christian Science," has attracted attention. The name is, I think, unfortunate to begin with. I shall not discuss the Christian part of it, except to humbly express the opinion that Providence would not have provided proper remedies unless they were to be used under His guidance to relieve suffering humanity. In regard to the science part, it can only be said that it is not founded on any true or enlightened science. I cannot help thinking that this practice is another illustration of the saying that "history repeats itself." In ancient and more modern days so-called faith cures have been carried out by the aid of ceremonies and incantations, and the erection of temples and accompaniments to still further act upon the imagination. According to what we read and hear, Christian scientists are following in the same footsteps. If Christian scientists will aid in causing temperance in stimulants and tobacco, as they are reported to have done in at least one case, they will be doing good; but if they continue to profess to cure real diseases by their methods, and to assert that there is no such thing as real pain, then we are justified in considering that they are qualifying to be placed on the list of persons practising quackery. A medical friend recently told me the opinion of a shrewd Scottish woman as to Christian science. She had been treated by this method for painful rheumatism, but without obtaining relief, and on being asked if Christian science had done her any good, remarked: "Christian science has not cured me, but I am cured of Christian science."

As quackery in the treatment of disease is now so prevalent, and is not confined to any one class, it may be well that we should consider if any and what means can be employed to check or limit it. It is to be feared that as so many of the public insist on being quacked, little can be done until they cease from running after quacks and their remedies and suggestions. At the same time, I think that the members of our profession can, and should, use their endeavours to assist in

putting down quackery. In the first place, they must not practise quackery themselves, for it is too true that quackery exists both in and outside the profession. They may also do much by carefully studying the cases of their patients, studying each individual case by itself, and not carrying out treatment in a mere routine manner. It is well known that diseases, although even of the same nature, may be modified or complicated, and unless these modifications or complications are recognised, satisfactory treatment will not result. Mistakes and failure in connection with diagnosis and treatment are, and probably always will be made, in spite of care and study, but there will be fewer of these if diagnosis is made more accurately, so as to make treatment more certain, and thus assist in lessening the disappointment of patients and their friends and prevent them seeking the advice of irregular practitioners and their remedies and procedures.

The Law for Patent Medicines.

It may be asked, Can anything be done by legislation to lessen quackery? In this country there is, unfortunately, no law to prevent the practice of quacks, so that anyone may advertise or practise the treatment of disease. In fact, it may be said that there is a complete condition of "free trade" as regards the treatment of disease. Government also receives financial support equal to £300,000 annually from the licences and stamps required by the sale of patent medicines. A distinguished graduate of this University, Dr Robert Hutchison, has recently published two very interesting lectures on "Patent Foods and Patent Medicines," and in them gives some analyses of these products. A study of these lectures will well repay you. In regard to patent medicines, the law is that they must be a genuine original invention, and that a complete description of them must be filed at the Patent Office. I need scarcely say that there are many remedies advertised under patent medicines in regard to which this law is not carried out. A Congress for the "Repression of the Illegal Practice of Medicine" was held in Paris this year, and a number of interesting papers on a variety of subjects were read and discussed, and several resolutions agreed to in connection with the many forms of

quackery in the treatment of disease, and also including the improper use of toilet and other appliances. In Germany anyone is free to practise medicine as long as the title of *Arzt* is not used, but during the last few years, committees of the medical profession have made official representations in connection with the suppression of irregular practices. It is to be hoped that the profession in this country will also agitate and endeavour to have passed some more stringent laws in connection with "quacks'" proceedings, and a stricter supervision carried out in regard to patent medicines.

Advice to the Graduates.

Now, before we part, I should like, as one of the present Fathers of the University, to offer a few words to those of you who have graduated in medicine for the first time, and have qualified yourselves to go out into the world and practise your profession. You have successfully passed your examinations, and you are now duly qualified, but you have still much to learn, not only in regard to your profession, but also in regard to your relationship with general humanity. You have signed a solemn oath that you will be loyal to your University and to your profession, and also that you will do everything conducive to the welfare of the sick, and in signing this oath you have taken upon yourselves a grave responsibility. The University asks you to face this responsibility, and to the best of your ability to loyally perform all that your oath demands of you. Let me quote to you with slight omissions the oath which Æsculapius demanded of his pupils before they entered into practice. It is, of course, written in the language of the times, but some parts of it, although not all, are quite as applicable now as they were then :—

"I swear by Apollo the Physician, and Æsculapius, and Health, and Panacea, and all the gods and goddesses, that according to my ability and judgment I will keep this oath and this stipulation, to reckon him who taught me this art equally dear to me as my parents, to share my substance with him and relieve his necessities as required, to look upon his offspring on the same footing as my brothers, and to teach them this art if they shall wish to learn it without fee or stipulation,

and that by precept, lecture, and every other method of instruction, I will impart a knowledge of the art to my own sons. I will follow that system of regimen which according to my ability and judgment I consider to benefit my patients, and abstain from whatever is deleterious or mischievous. I will give no deadly medicine to anyone if asked, nor suggest any such counsel. With purity and holiness I will pass my life and practise my art. Into whatever houses I enter, I will go into them for the benefit of the sick. Whatever in connection with my professional practice, or not in connection with it, I see or hear in the life of men which is not to be spoken of abroad, I will not divulge. While I continue to keep this oath unviolated, may it be granted to me to enjoy life and the practice of the art, respected by all men in all times; but should I trespass and violate this oath, may the reverse be my lot."

Graduates, it has been my privilege to practise my profession for many years among all classes, and during this time I have learned much, not only in regard to my profession, but also much of general humanity. I have also learned something from a study of the several thousands of students of medicine who have come under my observation. As a result of this experience, I wish to urge upon you the great importance of exercising sympathy not only in connection with professional matters, but in relation also to general human life. All of you have, I am sure, some feelings of sympathy, but you can, by education, train these feelings so as to increase their usefulness. The members of our profession, as a body, have the greatest power, owing to their special opportunities, to influence for good; they have the power to encourage in every way all that is good, and they also have the power to assist and influence for the better what may be the result of weakness or viciousness of disposition. In order to exercise full sympathy, it is essential that you should take every opportunity to carefully observe and study individual human nature. Individual human nature may be studied from selfish or improper motives, or from mere curiosity; but this is not the form of study I advocate, and if you carry out this study for proper reasons, you will find it a great assistance in treating your patient, and it will also bring to yourselves pleasant and

encouraging feelings. You will meet with trials, disappointments, and failures in connection with your professional work and life, but you will also meet with successes and gratitude; and I can assure you, from much personal experience, that true gratitude, shown even in the smallest way, does much to counteract what may have been unpleasant or depressing, and if time had permitted I could give you many striking examples of such gratitude and good feeling. Let me tell you of one amusing incident in illustration. A poor woman came from Ireland to be treated in our Infirmary. When she recovered she bestowed many blessings on all, with the characteristic fervour of her countrymen. After she returned home she sent over at Christmas a goose. It was not a very fat goose, but it was a goose, and with it came written injunctions as to its distribution. The Professor was to have one wing, the House-Surgeon the other, and the rest was to be divided among the nurses. I encourage my students to carry out this study, and it is always a pleasure to me in connection with Infirmary work to see them talking to the old women—for old ladies love a "crack"—conversing with the men, from whom they may often receive much information, and playing with the children, distributing a few coppers among them, and so educating themselves for their future duties as fathers of families. In regard to the younger women and girls, no encouragement is necessary, for there always seems to arise a natural and mutual sympathy between them. Graduates, the University wishes you all God-speed in your future life and work.

TWENTY-FIVE CONSECUTIVE CASES OF OPERATION FOR PERFORATED GASTRIC AND DUODENAL ULCERS

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SIMPLE gastric ulcer occasionally progresses without causing any inconvenience to the patient, who may be in apparently good health, until the rude awaking due to perforation indicates the serious nature of his malady. The diagnosis of perforation is generally sufficiently obvious, and there are definite signs and symptoms which lead one to a correct diagnosis. A history of indigestion can usually be obtained, either of recent date and comparatively mild, or of long duration and often intermittent. The dyspepsia is associated with pain after food and with vomiting, which may relieve the pain. The more classic evidences of gastric ulcer, hæmatemesis and melæna, are generally, however, lacking.

Perforation may occur at any period of the day, and at once gives warning by "doubling up" the patient with a sudden agonising pain referred to the umbilical region, which causes fainting and collapse. The patient has to lie down, and generally vomits. As a rule, the passage of flatus ceases, and symptoms simulating obstruction arise. Occasionally there may be action of the bowels.

The initial condition of shock varies in degree and prolongation, and there may be a few hours of quiescence, often most misleading, followed by recrudescence of the symptoms. As a rule, however, they rapidly progress.

The pain becomes generalised ; the abdomen becomes fixed, board-like, and rigid, and no longer participates in the respiratory wave. The shabby, rapidly quickening pulse indicates danger. Respiration increases in frequency, and the temperature has a tendency to rise. On palpation there is hyperæsthesia of the abdominal wall, and there is marked local tenderness evinced in the epigastric and supra-pubic regions. The anterior liver dulness is found to be diminished, and in the course of a few hours may be entirely lost. Rectal examination reveals tenderness and bulging in the pouch of Douglas. There is not any pain on micturition. The symptoms become aggravated and soon merge into those of general peritonitis.

Some idea of the extent to which history and symptoms vary, may be gathered from the concluding table of 25 cases, of which 15 were female and 10 were male.

In each of the cases, with two exceptions, there was some antecedent dyspepsia, and in nearly half was there vomiting. Hæmatemesis and melæna occurred only once or twice. Rupture took place between early morning and eleven at night, more frequently late than early, the patients at the time pursuing their ordinary avocations or going about. In 2 cases the patient was lying quiet in bed. All experienced sudden severe pain referred to the "pit of the stomach," and in 4 cases to the left shoulder. Vomiting was present in 18 cases. The liver dulness had completely or partially disappeared in nearly every instance, and is recorded only once as normal. It is replaced by a tympanitic note due to free gas within the peritoneal cavity, or occasionally to a distended and paretic colon. There was marked localised epigastric and supra-pubic tenderness; the latter, although not always distinctly evident, is a helpful sign. Blood counts in 7 cases gave a leucocytosis which varied from 7000 to 25,000. Case 18 is remarkable for the complete cessation of symptoms and their return within six hours.

The diagnosis is sometimes obscure. There is a mimicry between certain lesions, such as perforated gastric ulcer, acute appendicitis, acute pancreatitis, and the rupture of intestinal ulcers and neoplasms.

Influenzal gastric pains, gastric spasms, and colic, as is well known, may lead the surgeon to clear up a doubtful diagnosis by an exploratory laparotomy.

The question of diagnosis and operation is determined by a consideration of the salient features presented by the sudden onset of pain, the previous history of gastric ailment, the localised epigastric and supra-pubic tenderness, the associated abdominal rigidity and pain experienced in taking a deep breath, the diminution in the liver dulness, and the increasing frequency of the pulse.

The operation should be carried out at once, no matter how unpromising the future may appear. There is no other road of escape open, and the seemingly moribund patient may be roused by intravenous saline transfusion and the use of strychnine.

The abdomen may be opened under local anæsthesia with cocain and adrenalin, but the further manipulation certainly requires a general anæsthetic. Spinal anæsthesia, as Bier at present recommends for laparotomies, by injecting tropa-cocain as high as the level of the first lumbar vertebra, may yet prove very serviceable.

The most ready access is gained by a free incision in the middle line. Œdema of the extra-peritoneal fascia may be observed. A rush of escaping gas and fluid verifies the diagnosis and rapidly relieves the embarrassed respiration.

A broad retractor introduced at the upper angle of the wound serves to raise the abdominal wall and allows us to inspect and palpate the stomach with ease. The perforation may be difficult to find. It may be very minute, concealed or plugged by lymph, or be not very accessible. It may be recognised, however, if the fluid be cleared away, by the lymph in its vicinity, by the direction from which fresh fluid or gastric content wells, and frequently it is detected by the finger. If the lesser sac be distended with fluid, the ulcer is on the posterior aspect of the stomach and is reached by lacerating the gastro-hepatic or great omentum. On identification, the ulcer should be plugged with iodoform gauze and a fresh search made for other perforations. Tapping the distended stomach or colon may facilitate the investigation.

An incision should invariably be made in the mid-line above the symphysis pubis, and a couple of Keith's glass drainage tubes should be placed in the pouch of Douglas. Into the narrower of the tubes the nozzle of a large douche is introduced, and irrigation of the pelvis with warm sterilised salt solution is maintained while the ulcer receives attention. Excision of the ulcer is not to be recommended. It means loss of time and loss of blood without corresponding gain. Closure of the ulcer is effected with fine silk. A preliminary stitch or two may be used to transfix the whole thickness of the margins, and so diminish its size. The main security is afforded by a series of interrupted Lembert sutures introduced at some little distance from the margin of the ulcer, tightened up *en masse* and then tied. Over these a second row may be needful. A trace of iodoform is rubbed in to favour plastic repair. If there is much perigastritis, with friable or

unyielding tissue, it may be necessary to infold a large area of the gastric wall, and as this might occlude the gastric outlet, the operation of gastro-jejunostomy may prove essential, and should be performed forthwith. On three occasions this was found necessary. The whole region of the upper abdomen should now be carefully irrigated, and every peritoneal recess

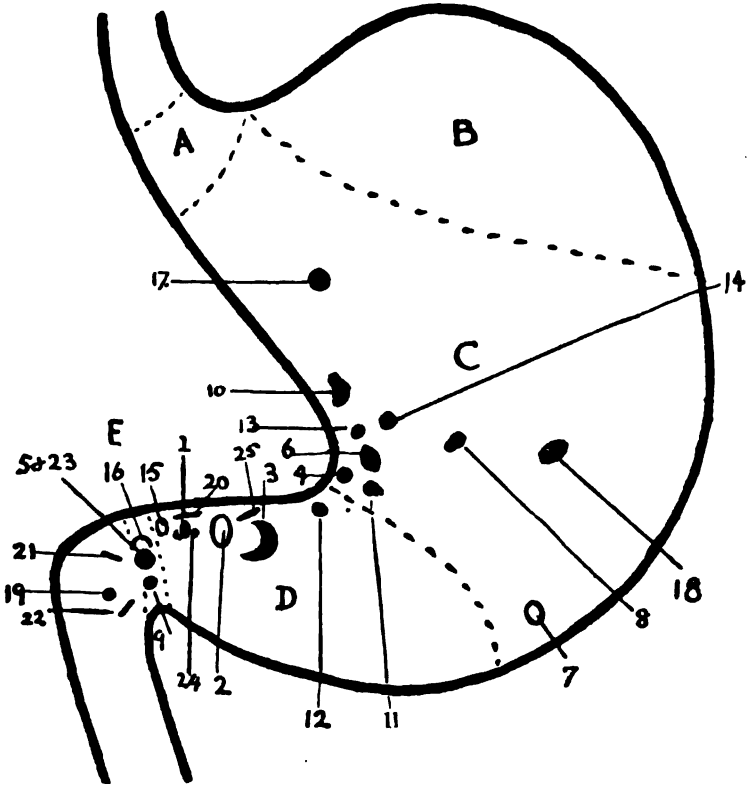


Diagram of stomach to show sites of perforation.—A, Cardiac portion; B, Fundus; C, Middle; D, Pyloric portion; E, Pylorus. Gastric ulcers posterior, 2, 7, 15, 16. Duodenal, 19, 21, 22.

douched till the return saline comes clear. In some cases we have simply swabbed out the region of the ulcer with moist gauze, but have never omitted careful pelvic irrigation. A large Keith's tube is left in the pouch of Douglas, and we have, in addition, generally drained the site of perforation with a Mikulicz tampon and drainage tube. The wound is now

closed. The head of the patient's bed should be raised about six inches in order to favour the gravitation of any discharge from the dangerous absorptive region of the diaphragm towards the less susceptible pouch of Douglas.

Perforations leading to acute symptoms occur mainly in the anterior aspect of the stomach, where there is less chance of adhesion to neighbouring structures. They are most frequent towards the lesser curvature and the pylorus. Of our twenty-five cases of perforation, eighteen were anterior, four were posterior, three were duodenal (see Figure). There may be more than one perforation. The ulcer varies in type from the characteristic small, sharply cut, terraced form with comparatively healthy surroundings, to the large, ragged rent in the midst of a chronic indurated perigastritis with œdematous serosa.

It would appear that as the acrid stomach contents escape into the peritoneal cavity that the whole serous membrane reacts, and rapid effusion of an alkaline nature takes place which neutralises the acid secretion. The greater part of the intra-peritoneal fluid discovered at operations is due to this source. Blue litmus paper acquires a deeper tint on contact with it, but reddens at once on touching the fluid at the very margin of the perforation. The duodenal ulcers, which tend to affect the anterior aspect of the first part, close to the pylorus, exude a mucus with a strongly alkaline reaction.

Recovery is frequently uneventful. The chief factor affecting the issue is the nature of the organisms liberated within the peritoneal cavity and the power of tissue resistance to the toxins evolved. Fortunately we do not meet with organisms of excessive virulence within the stomach, and when there is no stagnation or fermentation of the gastric contents, the highly acid nature of the gastric secretion which we so frequently meet in such cases inhibits the growth of most microbes. An additional source of sepsis may be due to the damage inflicted on the visceral peritoneum, permitting the passage of intestinal organisms such as the colon bacillus. Hence the value of a speedy recognition of the serious nature of the lesion, and the success which is likely to crown an early operation.

Cultures were made from eleven cases, and micro-

organisms were present in seven. They varied in kind. The colon bacillus was frequent. In four the result was negative. Gelatine and Agar tubes were employed, and this somewhat crude method, together with delay in incubation, may account for the tubes remaining sterile.

In considering the prognosis, we naturally take into consideration the size and position of the perforation, the date and the nature of the last meal, and the amount of material which escapes into the peritoneum.

There can be no doubt also as to the truth of the general statement that the longer the period which has elapsed since perforation, the graver is the outlook, although it fortunately did not hold good with our cases. Apart from this, more valuable prognostics are to be gained from the age of the patient, from the rate and condition of the pulse and the respiration. A pulse of 120 is to be feared, of 130 to be dreaded. The temperature is of less moment.

The aftercourse may be one full of anxiety, requiring extreme watchfulness and care, and is conducted on the lines common to abdominal operations. The pronounced thirst due to the loss of fluid by the peritoneal effusion may be allayed by rectal salines administered every four hours. The urine should be carefully examined and morphine given as indicated. If the pulse fail in strength and fulness and increase in rate, intravenous saline transfusion is most beneficial. One litre may be given, and when improvement is maintained thereafter for a couple of hours, transfusion may be freely repeated with every prospect of success, even if there be a subsequent flagging of the pulse.

Vomiting, if severe, persistent, or accompanied by hæmatemesis, is best combated by gastric lavage.

Pulmonary complications were responsible for some fatalities during the aftercourse. One case was tapped successfully for pleurisy, and two recovered after resection of portions of rib for empyema. The last of the three cases (18) was readmitted three months later, and succumbed to an intracranial abscess which we failed to discover on trephining.

The statistics which are added, founded on such a small number of cases, must be taken for what they are worth. They seem to illustrate, however, the relation of the rates of

pulse and respiration as influencing the prognosis. It will be seen that the mortality is not excessive, and that an early diagnosis may do much to render operation for gastric ulcer highly successful. It was impossible to save such cases as 16, who already had advanced congenital cystic disease, and who sank from uræmia; and 15, whose age, 71, and previous intemperance, precluded a hopeful result. There is no reason why the judicious country practitioner should not himself act in such emergencies, and by a comparatively simple operation, not in itself dangerous, save lives that otherwise might run still greater risk were they sent to a far distant hospital.

The concluding table may be referred to for additional information as to the individual cases.

I desire to express my thanks to the gentlemen who sent the cases, and to the pathologists of the Royal Infirmary who kindly superintended and examined the cultures.

STATISTICS.

I. Twenty-five consecutive cases of perforated gastric and duodenal ulcers—

Gastric, anterior	18
,, posterior	4
Duodenal	3

II. General mortality, 36 per cent.—

Males	10	4 died
Females	15	5 ,,

III. Age—

12½ to 20 years	3 cases	1 died	Mortality, 33 per cent.
21 ,, 30 ,,	11 ,,	1 ,,	,, 9½ ,, ,,
31 ,, 40 ,,	9 ,,	5 ,,	,, 55 ,, ,,
41 ,, 71 ,,	2 ,,	2 ,,	,, 100 ,, ,,

IV. Time between perforation and operation—

3 to 12 hours	7 cases	3 died	Mortality, 42 per cent.
13 ,, 24 ,,	13 ,,	5 ,,	,, 38 ,, ,,
25 ,, 51 ,,	5 ,,	1 ,,	,, 20 ,, ,,

V. Pulse rate—

76 to 120	13 cases	2 died	Mortality, 15 per cent.
121 ,, 130	6 ,,	2 ,,	,, 33 ,, ,,
Above 131	6 ,,	5 ,,	,, 83 ,, ,,

VI. Time and average pulse—

3 to 12 hrs	7 cases	P. 111	3 died	P. 117	4 recovered	P. 107
13 ,, 24 ,,	13 ,,	,, 126	5 ,,	,, 141	8 ,,	,, 117
25 ,, 51 ,,	5 ,,	,, 114	1 ,,	,, 128	4 ,,	,, 111

VII. Time, average pulse, and respiration rate of 23 cases—

Time.	Cases.	Av. Pulse.	Av. Resp.	Recovered.	Av. Pulse.	Av. Resp.	Died.	Av. Pulse.	Av. Resp.
3 to 12 hours	7	111	31	4	107	28	3	117	35
13 ,, 24 ,,	10	122	30	6	114	27	4	134	36
25 ,, 51 ,,	6	123	32	4	111	33	2	148	30

	Name. Age. Occupation. Date of Operation. Interval between Rupture & Operation. Event.	Previous History.	Onset.	Provisional Treatment.	Condition Prior to Operation.	Local Condition.	Operation.	Aftercourse.
1	Mr W. L., 21; cabinet maker; 16, xii, '01; 26 hours; recovered.	Indigestion, several years, pain across stomach for 3 weeks.	Sudden, 2 hours after heartybreakfast, severe pain causing him to fall down; vomited shortly after and later twice or thrice.	Opium by mouth, and morphine.	P. 100; T. 108.8: R. 26; pain and tenderness over recti, especially tender above and to right of umbilicus; liver dulness less, quite gone within an hour; rectal tenderness.	Small ulcer, anterior near pylorus; perigastric clear fluid and lymph.	$CHCL_3$; upper part of abdomen dried out; pelvis washed out; drainage.	Good recovery.
2	Miss A. G., 23; domestic servant; 14, x, '02; 50 hours; recovered.	Two years ago, pain after food and anæmia; well since.	Sudden pain at left costal margin, left shoulder, and axilla, when lifting a couple of pails: had to lie down; vomited once blackishfluid.	Whisky; poultices.	P. 125; T. 99; R. 26; tumid abdomen; general tenderness, maximum at left costal margin.	Large ulcer near pylorus on posterior wall.	Ditto.	Good recovery.
3	Miss L. T., 22; domestic servant; 21, iv, '03; 4 hours; recovered.	Five years' indigestion; hypogastric pain for 3 days.	Sudden.		P. 126; T. 100.6; R. 30; general acute tenderness: no liver dulness.	Large ulcer on anterior wall near pylorus and lesser curvature; much clear fluid, lymph and potato.	Whole peritoneal cavity swabbed out; drainage	Good recovery.
4	Miss M.Y., 21; housemaid; 22, ix, '03; 24 hours; recovered.	Three years' dyspepsia; hæmatemesis at New Year; passed blood by rectum from 17th to 20th September.	Sudden, violent pain and vomiting; action of bowels this morning.	Morphine.	P. 128; T. 100.6; R. 24; great abdominal pain, felt also in chest and shoulders: rigid abdomen; general tenderness pronounced above umbilicus; liver dulness much diminished.	Small round ulcer, anterior, near lesser curvature, five inches from pylorus; slight tendency to hour-glass contraction.	Ditto.	Good recovery; symptoms again came on; fresh rupture, 3, xi, '04, see Case 11.
5	Mrs W., 37; 25, xi, '03; 17 hours; died.	Indigestion all her life; great tea-drinker: during last six months increased pain radiating from the back to the abdomen, relieved by vomiting.	Sudden pain and collapse.		P. 145; T. 103; R. 40; very tender tumid abdomen; no liver dulness.	Large ulcer, anterior aspect of pylorus.	Laparotomy with cocain and adrenalin; $CHCL_3$ in small amount; posterior gastro-jejunostomy since pylorus was narrowed after suture of ulcer; ditto.	Improved somewhat: then had to be transfused; died twelve hours after operation. Sectio: Roughening of diaphragmatic pleura.

	Name. Age. Occupation. Date of Operation. Interval between Rupture & Operation. Event.	Previous History.	Onset.	Provisional Treatment.	Condition Prior to Operation.	Local Condition.	Operation.	Aftercourse.
6	Miss M'E., 25; 31, i, '04; 18 hours; died.	Old indigestion.	Sudden, severe pain.		P. 124; T. 99.8; R. 36; does not look very ill; tender epigastric and supra-pubic regions; groins less so; rigid abdomen.	Small perforation, anterior, near lesser curvature.	$CHCl_3$; whole peritoneal cavity washed out; drainage.	Did well till following afternoon, when pulse rose, coffee ground vomiting came on; pelvis washed out; result negative; died 18 hours after operation.
7	Miss N. B., 25; domestic servant; 20, ii, '04; 10 hours; recovered.	For some years pain and vomiting after food; very anæmic during last 2 months; has vomited after every meal last week.	Awakened by sudden epigastric pain and bilious vomiting; bowels have acted once.		P. 102; T. 100.2; R. 24; abdomen rigid; general tenderness, marked in epigastrium; liver dulness slightly less; some rectal tenderness; leucocytes 7000.	Small ulcer, posterior, near greater curvature in lesser sac distended with fluid; no fluid in general cavity.	Ditto.	Sickness and hæmatemesis next day; stomach washed out; vomiting ceased; transfusion necessary at night; good recovery.
8	Mrs H., 40; 13, iv, '04; 6 hours; died.	Pain after food and vomiting for some time.	Sudden epigastric pain and collapse.		P. 140; T. 100.8; R. 40; abdomen rigid and exceptionally tender.	Small ulcer, anterior aspect cardiac end, midway between the curvatures.	Ditto.	Transfused at intervals of 4 to 6 hours; she held her ground for 24 hours and then sank, 32 hours after operation. Sectio: general peritonitis.
9	Mr M. Y., 48; labourer; 26, x, '04; 24 hours; died.	Eight years' indigestion; pain and vomiting after food; intemperate; a daughter died of perforated gastric ulcer.	Sudden vomiting of and passage of black matter at stool; acute epigastric pain.		P. 132; T. 97; R. 3·; fixed abdomen, tender, especially over pubis; no liver dulness.	Small clean cut ulcer near posterior aspect of pylorus; coffee-ground like fluid in peritoneum; gangrenous omentum.	Distended stomach emptied with trocar and cannula; gangrenous patches removed; ditto.	Transfused after operation; broncho-pneumonia, purulent sputum, rise of temperature; death on 7th day.
10	Miss Y., 27; 18, x, '04; 17 hours; recovered.	Has been under treatment for gastric neuralgia; pain after food.	Sudden epigastric pain and vomiting.		P. 120; T. 100; liver dulness diminished.	Small ulcer near lesser curvature and pylorus.	Ditto.	Good recovery.
11	Miss M. Y., 22; housemaid; 3, xi, '04; 19 hours; recovered.	See former history, Case 4; good health since operation for perforation; quite recently pain after food and vomiting.	Severe abdominal pain and vomiting.		P. 104; T. 98.4; R. 24, at 11 A.M.; did not look ill; slight abdominal pain and tenderness; abdominal respiration; liver dulness normal; at 3.30 P.M. P. 110, T. 101, R. 28; liver dulness gone.	Ulcer near old site; marked hour-glass contraction; many omental adhesions and bands.	Ditto; posterior gastro-jejunostomy.	Good recovery.

	Name. Age. Occupation. Date of Operation. Interval between Rupture & Operation. Event.	Previous History.	Onset.	Provisional Treatment.	Condition Prior to Operation.	Local Condition.	Operation.	Aftercourse.
12	Miss B. K., 21; 19, xii, '04; 48 hours; died.	Epigastric pain after meals, shooting to back and shoulders, followed by vomiting of undigested food, eighteen minutes' duration; better for a year, worse for last 12 months.	Severe epigastric pain and vomiting.		P. 168; T. 100.2; R. 32; whole abdomen very tender, tumid; no liver dulness.	Large ulcer near middle of lesser curvature; much fluid; flakes of lymph and food stuff.	$CHCL_3$; peritoneum washed out; drained.	Death.
13	Miss H., 34; 17, i, '05; 9 hours; recovered.	Two years ago had for two months pain after food; good health since; 14 days ago slight return of pain.	Sudden severe epigastric pain.		Pulse 100; T. 100; R. 28; anxious expression, rather rigid abdomen; pain in hypo-gastric and left hypochondriac regions; maximum tenderness between umbilicus and ensiform cartilage and above pubis; liver dulness gone.	Small ulcer near lesser curvature towards cardiac end; œdematous extra peritoneal tissue	Ditto.	Good recovery.
14	Master A. P., 12½; 15, ii, '05; 18 hours; recovered.	Pain after food for last 12 days, and slight cold.	Felt very ill; no great tenderness; vomited, but passed a quiet night.	Hot fomentations.	P. 130; T. 101.2; tender abdomen; no liver dulness.	Small punched out ulcer near middle of lesser curvature.	Ditto.	Signs of right basal pneumonia on 3rd day, on 8th day both lungs affected; P. 126, T. 103, R. 48; after an anxious time got well; oxygen inhalation.
15	Mr T. W., 71, dairy man, 14, iv, '05; 9 hours; died.	Three years ago an attack of vomiting, pain, and constipation; one year ago a second; has an umbilical and double inguinal hernia.	Sudden sickness and vomiting of reddish material.	Opium.	P. 112; T. 98; R. 36; tenderness above and below umbilicus; liver dulness diminished.	Posterior aspect of pylorus, large ulcer; gas, fluid, and gastric contents in quantity. Culture: colon bacillus.	Ditto.	Died 8 hours after operation. Sectio: peritonitis.
16	Mr J. F., 32, labourer, 5, v, '05; 18 hours; died.	Intemperate; no data.	Sudden abdominal pain; distension.		P. 136; T. 98; R. 40; patient had a peculiar dazed look; was not clear-headed, and had dusky complexion.	Ulcer on anterior aspect of pylorus; much fluid; pure cultures colon bacillus.	Ditto.	Rapid sinking; symptoms of uræmia: bladder empty. Sectio: advanced congenital cystic disease of both kidneys, cysts in pancreas and mesentery, hypostatic congestion both lungs, peritonitis.

	Name. Age. Occupation. Date of Operation. Interval between Rupture & Operation. Event.	Previous History.	Onset.	Provisional Treatment.	Condition Prior to Operation.	Local Condition.	Operation.	Aftercourse.
17	Miss C. K., 35; 2, iv, '05; 13 hours: recovered.	For the last 14 years intermittent attacks of sharp pain after meals in epigastrium and between the shoulders; vomiting since Xmas; well till last night; drinks much tea.	Sudden epigastric pain and vomiting.		P. 120; T. 99; R. 26; abdominal tenderness; liver dulness less.	Ulcer anterior aspect; cardiac portion, 2½ inches from lesser curvature; cultures from near rupture gave many colonies of streptococcus pyogenes, and a few of staphylococcus aureus; from the pouch of Douglas, pure culture staphylococcus pyogenes.	$CHCl_3$; peritoneum washed out; drained.	Left sided pleurisy; aspirated 10th June; Frænkel's pneumococcus; improvement; empyema followed: resection of rib; strept. pyogenes; good recovery.
18	Mrs C., 29; 21, vii, '05; 14 hours; recovered.	For several years pain after food, relieved by meal; well since March.	Sudden sharp shooting pain epigastric and umbilical regions and down left upper arm; symptoms passed off completely, but returned worse in 6 hours.		P. 140; T. 100; R. 24; pinched look; knees drawn up; tense painful abdomen; most tender in left hypochondriac and iliac regions; liver dulness normal; leucocytosis, 8000.	Large ulcer middle of anterior aspect rather nearer greater curvature; much gastric content and fluid; bacillus of colon type in culture from pouch of Douglas and from near stomach; from latter site also a few cultures of a streptococcus.	Ditto.	Left sided empyema; resection of rib; good recovery. [Readmitted October suffering from intracranial abscess; unsuccessful trephining; died.]
19	Mr R. J., 21, flydresser; 24, x, '05; 10 hours; recovered.	Good health; appendix removed June 1905.	Sudden violent abdominal pain, almost fainted; seen at once; P. 97, small, thready; T. *subnormal*; within an hour liver dulness gone; vomited twice.	Morphine Hypodermically.	P. 102; T. 98; R. 32: shallow thoracic; general tenderness in lower part of epigastric region; not marked in supra-pubic region; general tympanitis; no liver dulness.	Minute aperture on anterior aspect of duodenum close to pylorus; serous fluid and flakes of lymph; omenta œdematous; culture negative.	$CHCl_3$; region of ulcer swabbed; pelvis washed out and drained.	Good recovery.

	Name. Age. Occupation Date of Operation. Interval between Rupture & Operation. Event.	Previous History.	Onset.	Provisional Treatment.	Condition Prior to Operation.	Local Condition.	Operation.	Aftercourse.
20	Mr C. S., 40; 11, xi, '05; 18 hours; recovered.	Periodic attacks of indigestion and vomiting every six weeks for past 13 years; never vomited blood.	Doubled up with sudden violent epigastric pain; shortly after vomited; slept 1½ hours, arose, and pain and vomiting returned; 3 hours after attack, P. 120; full bounding rigid abdomen; vomited all night.	Hot fomentations; laudanum internally.	P. 120, weak, intermittent; T. 98.3; R. 44; abdomen rigid, fixed, slightly tumid below umbilicus; general tenderness, excessive in epigastric and supra-pubic areas; liver dulness diminished; peculiar "boxy" note all over abdomen; extremities cold and blue.	Small clean cut ulcer on anterior aspect of stomach ½ inch from pylorus; œdema of extra peritoneal tissues; much yellow sero-purulent fluid; viscera covered with lymph. a patch on upper surface of the liver. Cultures: peritoneal. yeast forms; pouch of Douglas, yeast forms, colon bacillus, diplococcus like pneumococcus.	Ditto, as above; region of wound. as well as pouch of Douglas, drained.	Pulse barely perceptible at end of operation; strychnine and digitalis; 3 hours after. 140; intravenous saline; pulse fell to 120; cough, expectoration, diarrhœa; 3 weeks after right pleural sac aspirated on 2 occasions, yielded 23 and 10 oz. slightly turbid fluid; eventual recovery.
21	Mr G. A. F., 22, hotel boots; 19, xii, '05; 26 hours; recovered.	Good health.	Sudden severe pain just above umbilicus; suffered all night; vomited 3 times black material; retention of urine. no passage of flatus.		P. 102, strong. regular; T. 100; R. 56; rapid, shallow, jerky, painful; abdomen not tumid, rigid, board-like; marked tenderness in epigastric and right hypochondriac regions; slightly tender in left lumbar, but not tender in supra-pubic region; tenderness and downward projections on rectal examination; no liver dulness; leucocytes 16,000.	Punched out oblong ulcer with friable margins on anterior aspect of duodenum close to pylorus; much gas and fluid; distended stomach punctured with trocar and cannula, 6 oz. content and this escaped; ulcer very inaccessible, covered by liver.	Cocain and adrenalin followed by $CHCl_3$; peritoneal cavity washed out; wound and pouch of Douglas drained.	Good recovery.
2	Miss G. B., 27; 25, xii, '05; 31 hours; recovered.	For years has had pain after food; past year in better health.	Doubled up with sudden pain low down on right side of abdomen; vomited all night; better next morning, till pain and vomiting returned; no passage of flatus.		P. 118; T. 99; R. 26; shallow, thoracic; abdomen slightly tumid; general tenderness, maximum above umbilicus and in right iliac fossa; some supra-pubic tenderness; liver dulness gone; marked tenderness and slight boggy feeling per rectum; leucocytes 25,000.	Ulcer, oblong, ½ inch, towards lower margin first part of duodenum; much gas and turbid fluid; that in pouch of Douglas less purulent than usual. Cultures: sarcinæ, various bacilli and diplococci like pneumococci.	$CHCl_3$; peritoneal cavity washed out; pouch of Douglas drained only.	Good recovery.

	Name. Age. Occupation. Date of Operation. Interval between Rupture & Operation. Event.	Previous History.	Onset.	Provisional Treatment.	Condition Prior to Operation.	Local Condition.	Operation.	Aftercourse.
23	Miss M. S., 31, office; 16, i, '06; 10 hours; died.	Indigestion for many years; during last month on milk diet.	Seized with sudden abdominal pain when at work; vomited twice.		P. 100. rather feeble, small volume; T. 99.4; R. 30; shallow, halting, painful; abdomen rigid, hard; epigastric tenderness in above umbilicus and supra pubic; right lumbar and iliac regions tender; general tympanitis: liver dulness gone; rectum tender, no boggy feeling; leucocytes 14,000.	Round punched out ulcer, friable margins towards upper anterior margin of pylorus; much serous flake laden fluid; the narrowed pylorus so reduced by suturing, posterior gastro-jejunostomy performed. Cultures: nothing developed.	Ditto; peritoneal cavity washed out; wound and pouch drained; posterior gastro-jejunostomy.	Did well till 4th day; then followed refusal of food, hallucinations and delirium; P. 120; T. 102; death on 10th day. Sectio: no peritonitis; consolidation of upper lobe and appearance like confluent broncho-pneumonia; some acute pleurisy; left lung some congestion and œdema; liver, fatty changes; kidneys, fatty; some degree of chronic nephritis present.
24	Mr S. N., 35, upholsterer; 17, ii, '06; 24 hours; recovered.	Pain 2 or 3 hours after food for 4 or 5 years; frequent coffee ground vomit; has been treated for gastric ulcer; a heavy drinker for 5 years.	Sudden general severe abdominal pain when lying ill in bed; vomited 5 or 6 times; easier when lying on left side; flatus passed after enema.	Morphine.	P. 76, and strong; T. 98; R. 20; tumid abdomen; restricted motion; marked epigastric, umbilical, and supra-pubic tenderness; maximum just above umbilicus; tender in right lumbar and iliac regions, and slightly on left side; distinct superficial succussion and splashing sound elicited between umbilicus and pubis; face pinched, hands cold; leucocytes 8000	Longitudinal ulcer, ¾ inch, at upper margin of stomach close to pylorus; pylorus narrowed, dense cicatricial contraction; much blackish coloured fluid; stomach emptied by puncture, and posterior gastro-jejunostomy performed.	Ditto; peritoneal cavity washed out; wound closed; pouch of Douglas drained; posterior gastro-jejunostomy.	Good recovery.
25	Mr A. M., 35, painter; 1, v, '06; 51 hours; died.	Gnawing abdominal pain off and on from Oct. '04 till Sept. '05, when it came on in spasms; vomiting from January onwards; latterly it ceased; weakness of legs; no teeth; has had syphilis.	Severe abdominal pains; iliac fossæ tender; vomited yesterday large amount of grey acid material, and felt relieved.		P. 128; T. 97.8; R. 28; abdomen fixed, distended, tender above umbilicus, over cæcum, and especially in left lumbar region; no supra-pubic tenderness; leucocytes 17,000.	Round ulcer, ¾ inch, on lesser curvature extending backwards; much dark grey turbid fluid; ulcer very inaccessible; distended colon punctured to gain room and relieve tension; diaphragm and liver coated with lymph. Culture: pure bac. coli.	Ditto; peritoneal cavity washed out; wound and pouch of Douglas drained.	Pulse imperceptible; strychnine; P. 134, six hours later, and fell to 126 after transfusion of 1 quart saline; the respirations increased to 40, and he sank 14 hours after operation. Sectio: much plastic lymph about liver and diaphragm. Leakage from one suture.

RUPTURED GASTRIC ULCER IN A BOY AGED TWELVE YEARS

By G. KEPPIE PATERSON, M.B., F.R.C.P.Ed.

THE patient was a boy, aged twelve years eight months. I had attended him all his life and he had not suffered from any special ailment except recurring laryngeal catarrh. His gastric illness began with pain, indefinitely located about the epigastric region, occurring irregularly as regards the time after food; sometimes it was half an hour or two hours, or immediately after; at times there was no pain after a meal. The pain was of a burning character; he had no gastric flatulence nor vomiting. The tongue was very slightly furred. I put him on light diet and dyspeptic remedies, but these did not help him much. These symptoms continued twelve days, when about 7 P.M., after a light dinner, he suddenly felt a very severe pain in the abdomen. I saw him an hour after and found him collapsed, pale, with slow pulse and rigid abdomen; there was no loss of liver dulness and the temperature was normal. He complained much of pain in the abdomen about the umbilicus, and almost more of pain in the left shoulder, the latter aggravated with each inspiration. The abdominal pain was relieved with a fomentation and gentle friction, and all symptoms of shock had passed off within half an hour. It looked like a case of severe colic in a child, but the shock and previous pain made me doubtful, and I left instructions to be sent for later on if he became worse. I did not see him till nine next morning. He had vomited for the first time at 9 P.M., and again once through the night, but there had been frequent retching. The pain in the abdomen had become easier during the night. There were all the signs of peritonitis present, distended abdomen, temperature raised, and loss of liver dulness in front. There was a peritoneal burst, and Mr Caird operated at 1 P.M., eighteen hours after the rupture.

On opening the abdomen, general peritonitis was found to be present, with a mass of lymph over the liver and stomach; when this was separated off, a punched-out ulcer about the size of a small split pea was detected on the anterior wall, about 2 inches from the middle of the lesser curvature. Two smears of the peritoneal fluid were taken, and afterwards one

was found to be negative, the other showed a culture of staphylococci. The peritoneum was washed out and the lymph swabbed off the surface of the liver and from the pouch of Douglas. A drain was inserted in the wound and another above the pubes leading to the pouch of Douglas. He was given nutrient enemata for three days, then fed for two days partly by enemata and partly by the mouth; on the sixth day the enemata were discontinued. After the operation, and during the subsequent lung complication, his digestion was good, and he was able to take a considerable quantity of nourishment; it was only during convalescence he showed signs of gastric catarrh. On the third morning after the operation he had a dusky hue, and his temperature was sub-normal; at 10 P.M. I found a patch of dulness with tubular breathing at the right base posteriorly. His temperature two hours before this was 98.6°, and at midnight it had risen to 100°. The dulness spread rapidly till two-thirds of the lung became involved. On the seventh day after the operation he showed signs of cyanosis and I began oxygen inhalation. His cough caused him much distress, but I was never able to get any mucus for bacteriological examination, as the sputum was small in amount and he had not the strength to expectorate it. Coughing was also sometimes attended with laryngeal spasm, as at the onset of his illness he had one of his laryngitis attacks. On the eighth day the base of the left lung became consolidated and rapidly extending involved one-third of it. His condition was now very serious. His temperature, at first irregular, began to show a morning remission, falling to normal in early morning, but rising in the forenoon and afternoon, the rising causing great distress. This morning remission did much to relieve the strain on his strength. On the ninth day after the operation, during the afternoon rise, his condition became very dangerous. His respirations varied up to about sixty a minute, the pulse was racing, at one time pulseless with marked cyanosis even though he was inhaling some oxygen; the slightest cough produced suffocative attacks with extreme dilatation of the pupils just as one meets in chloroform syncope, and there were spells of unconsciousness. Dr Affleck saw him at the time, and to all appearance he was dying. Mr Caird was hopeless. His parents were informed of his expected decease. Still we persevered. The

oxygen funnel was held constantly close to his chin and mouth, and the oxygen given as fast as it would pass through the wash bottle; hypodermic injections of strychnine were repeatedly given. The spasm of the larynx was averted by applying hot sponges to the larynx as required. The temperature fell towards midnight and his condition was much relieved. Next morning, owing to the character of the temperature, the right pleura was explored with a syringe to ascertain if there was any empyema, but no pus was found. The afternoon brought a return of the distress and anxiety, but the symptoms were not so severe. On the following four days, though always suffering from the rise of temperature, he gradually improved, and on the fifteenth day after the operation his temperature remained normal all day. His convalescence was very slow, the right lung taking a month to clear up. He is now well and strong. He had different medicines during the illness, but the very free inhalation of oxygen seemed to be the main agent in his recovery.

The cause of his illness is obscure. He had never suffered from any gastric trouble, was especially fond of broth and vegetables, and he ate slowly, masticating his food well. Previous to the onset there had not been any indiscretion in diet, and he had no knowledge of swallowing any fish bone or anything likely to injure the mucous membrane. There was slight caries of one incisor tooth, all others were in a perfect condition,—a very slight source of possible oral sepsis.

Gastric ulcer in children is a rare condition, though many cases have been recorded. Several fatal cases of hæmatemesis and of intestinal hæmorrhage, due to this cause, have been reported occurring in infants between the ages of thirty hours and fifteen days. Ulcers of the stomach have been found post-mortem at all ages in children, in an acute and chronic condition, with and without adhesions to the neighbouring organs; single simple ulcers, also multiple; by themselves or accompanying general tuberculosis and typhoid. The largest number of cases is contained in a paper by Stowell in the *New York Medical Record* of 8th July 1905. Ruptured gastric ulcer is very rare, and I have prepared an abstract of all the reported cases in children under fourteen years of age that I have been able to discover. I found fourteen cases recognised

post-mortem, and only one during life besides this case. They have been arranged according to age.

Grainger Bisset (1), an infant, m., died 45 hours old, after severe intestinal hæmorrhage. Post-mortem a ruptured punched-out ulcer was found on the posterior wall of stomach, over the lesser curvature, about half inch from the cardiac opening.

Cade (2), infant, two months old, suffered from diarrhœa and vomiting. Post-mortem a single perforating ulcer was found on the posterior wall opening into a cavity bounded by the pancreas, meso-colon, and transverse colon.

Northrup (3), f., one year old, suffering for a month from vomiting and diarrhœa. Stomach covered with small follicular ulcers, and a large one that had perforated.

Colgan (4), f., two and a half years, died of convulsions with pyrexia; ruptured ulcer on the posterior wall near the lower border of the fundus.

Porter Parkinson (5), m., two years two months, gastric symptoms, with fever, for ten days, then hæmatemesis and acute peritonitis. Ulcer with a perforation of the size of a pin's head near the centre of the posterior wall of the stomach.

Bechtold (6), 1904, f., aged five and a half years, ill five months; a sudden illness diagnosed as peritonitis due to appendicitis. An incision over the appendix liberated pus, but appendix was not diseased. Post-mortem a perforated ulcer was found in the greater curvature.

Reichelt (7), m., eight years; suffered from pains in the stomach. Perforation found 1 c.m. above the pylorus in the lesser curvature.

Stowell (8), f., eight years, always delicate, recent gastric trouble with vomiting. Two perforated ulcers were found on the posterior wall about two inches from the pylorus.

Buzzard (9), f., nine years; discomfort after food for a short time, sudden perforation and death. Rupture of ulcer in the lesser curvature of the stomach, midway between pyloric and œsophageal openings.

Barker (10), m., ten years; three or four days ill, collapsed and died in two hours. Four ulcers in stomach, two of which had perforated.

Leith (11), f., ten years; left pneumonia, followed by left empyema. Post-mortem, ulcer of stomach had perforated the diaphragm.

Gröss (12), f., twelve years, had acute tuberculosis. Two small and one large ulcer in stomach; this large one had perforated into the omentum, evidently shortly before death.

Rufz (13), f., thirteen years; dyspepsia for some months. Perforation of an ulcer, two inches broad, in the lesser curvature.

Barthaz and Sanné (14), f., thirteen years, had dyspeptic symptoms and vomiting. Death very rapidly after perforation from an ulcer on lesser curvature of stomach.

These were all discovered post-mortem. The following is the record of the only other case beside my own that was discovered during life.

Cheyne and Wilbe (15), m., thirteen years; had some stomach-ache one day, which passed off with a hot-water bottle. Next day, after early dinner, he had severe pain in the abdomen and became very ill in the afternoon. He was seen by Mr Watson Cheyne in the evening, who was of opinion that it was a case of perforation of an abdominal organ, probably fulminating appendicitis. The operation for appendicitis was begun, gas escaped from the abdomen, and some whitish fluid. The appendix was found to be thickened, reddened, and contained a large concretion. It was removed, but no perforation was found in it or in the cæcum. As there were no fæces in the abdominal cavity, another incision was made over the stomach, and after careful search a ruptured ulcer was with difficulty discovered high up on the anterior surface about one inch from the cardiac end. He recovered without complication.

A case is reported in the *British Medical Journal* of October 28, 1899, of a girl, aged nine years, who had been operated on for ruptured gastric ulcer; Dr A. R. Parsons informs me it is a misprint for 19. It is unfortunate, as the case is erroneously repeated in different statistics and papers.

REFERENCES.

1. Bisset. *Lancet*, July 8th, 1905.

2. Cade. *Revue Mensuelle des Maladies de l'Enfance*, Paris, 1898, xv. pp. 57-70.

3. Northrup. Rotch, *Pediatrics*, p. 853.
4. Colgan. *Medical News*, 1892, p. 409.
5. Parkinson. *Reports of the Society for the Study of the Diseases of Children*, vol. i. p. 143.
6. Bechtold. Stowell's Paper.
7. Reichelt. *Wiener medizinische Presse*, No. 3, 1905.
8. Stowell. *New York Medical Record*, July 8th, 1905.
9. Buzzard. *Trans. Pathol. Soc. of London*, vol. xii. p. 84.
10. Barker. *Brooklyn Medical Journal*, 1902, p. 519.
11. Leith. *International Clinics*, vol. iv. 4th series, p. 49.
12. Gröss. *Jahrbuch f. Kinderheilkunde*, n. f. 19, 1883, p. 331.
13. Rufz. *Gazette Médicale*, 1843, p. 673.
14. Barthaz and Sanné. *Maladies des Enfants*, 3rd ed., vol. ii. p. 367.
15. Cheyne and Wilbe. *Lancet*, June 11, 1904.

A CASE OF CONGENITAL ANÆMIA ASSOCIATED WITH JAUNDICE

By A. HILL BUCHAN, M.A., M.B., M.R.C.P.,
and
JOHN M'GIBBON, M.B., M.R.C.P.

History.—The following case of anæmia associated with jaundice occurring in a new-born child has seemed to us worthy of being placed on record, owing to the somewhat remarkable features present in the blood. The child, a fairly well-developed male, was born on the 7th day of October 1904. The mother had an easy labour, which terminated naturally, the only thing of note being the occurrence of some hæmorrhage during the third stage, which was found to be due to a partially adherent placenta.

No symptoms had appeared during the pregnancy which suggested any form of toxæmia.

The urine had been examined one month before labour, and showed no trace of sugar or albumin.

It was observed that the umbilical cord was unusually pale in colour, of large size, and continued to pulsate forcibly for a longer time than it generally does.

As the child was in a condition of asphyxia pallida, the cord was not tied for fully five minutes, although still pulsating, by which time the child had recovered, cried freely, and breathed regularly. It was then observed that the child's

entire body was of yellow tinge, not like that of ordinary jaundice, but a peculiar lemon tint, especially pronounced over the face, chest, and abdomen. The condition of the liver and spleen was not examined on the day of birth, but about four days later it was observed that the liver was easily palpable, and that the edge of the spleen could just be felt at the costal margin, but not extending beyond it.

By the fourth day the pale yellow tint of the face and chest had passed into a deeper tinge, more like that symptomatic of catarrhal jaundice.

The sclerotics, however, remained perfectly clear. On the seventh day the liver margin was practically unchanged, but the spleen was becoming more easily palpable.

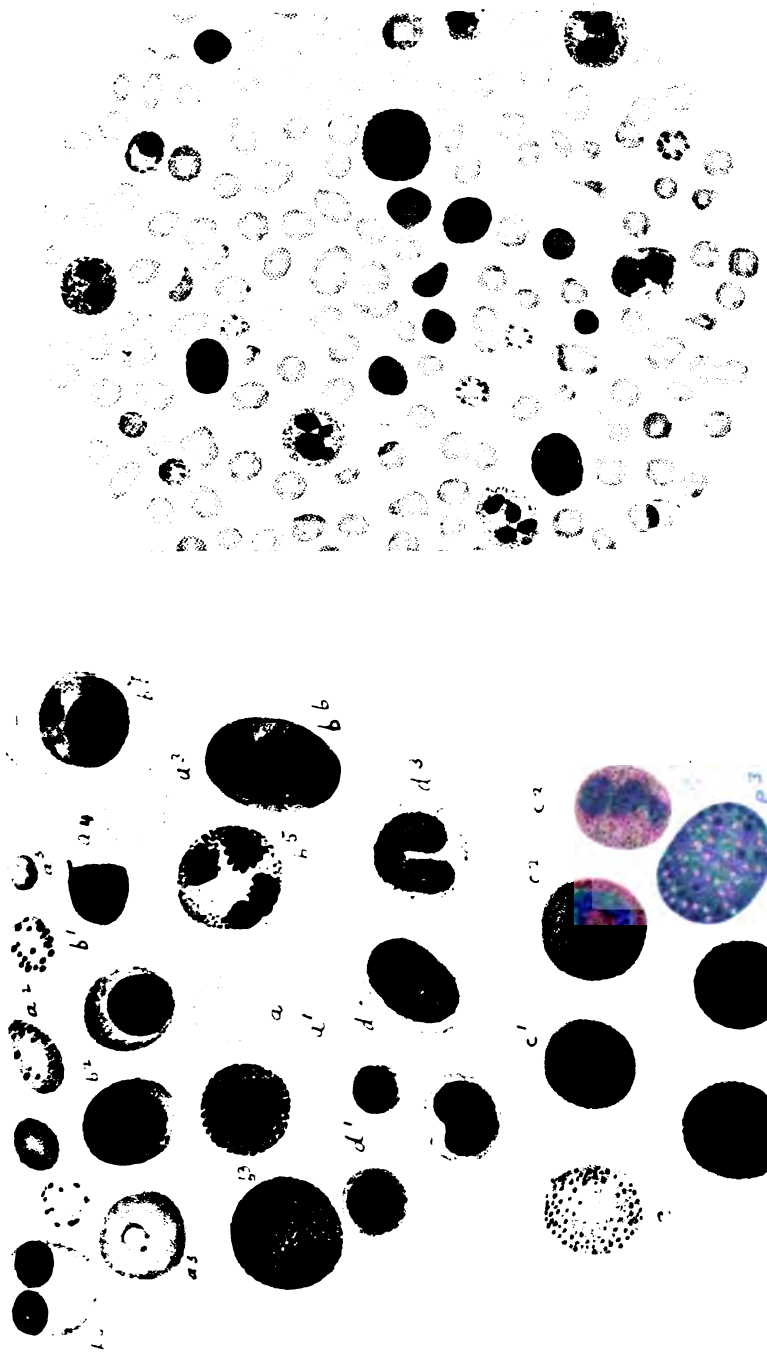
During the second week the deep jaundiced tint gradually disappeared, leaving the colour of the face, chest, and abdomen almost identical with the pale lemon colour noticed at birth.

At the same examination it was found that the liver projected about half an inch below the costal margin in the mammary line, and that the spleen had been enlarging, and could now be felt also one half inch below the costal margin, its edge being sharp and well defined.

There was no distension of the abdomen, and there were no hæmorrhages anywhere. A systolic bruit was audible at the apex and base of the heart. The lymphatic glands were slightly enlarged all over, more especially in the cervical and inguinal regions, and more so than we believe to be normal in the average healthy infant. The thyroid gland did not appear to be enlarged. The child's stools were pale in colour, and continued to be so until it was a month old.

During the third week no special change was noticed except that the spleen was still gradually enlarging, and now reached approximately one inch beyond the costal margin. By the end of the fifth week the edge of the spleen reached exactly midway between the costal margin and the umbilicus, its point of maximum enlargement, and after this time it very gradually diminished in size. On examination at the end of the seventh week the following notes were made :—

The child has been given one drop of Fowler's solution of arsenic for three weeks. The lemon tint has left the chest and abdomen, but is still quite apparent on the face. The



PLATES I.-II.—TO ILLUSTRATE PAPER BY DR HILL BUCHAN AND DR JOHN M'GIBBON.

liver has now receded from the costal margin and cannot be felt, and the spleen can only be felt just at the costal margin.

It is of some interest to note that whereas on the fourteenth day the glands were distinctly palpable in the region of the neck, axilla, and groin, but especially in the latter, no trace of glandular enlargement could now be felt.

The child weighed 8 lbs. 4 oz., and is in every respect more vigorous. The soft systolic bruit audible at the apex and base of the heart has disappeared. From this period the child continued to thrive very steadily, and at the present time—July 1906—is a healthy and well-developed child.

Hæmatology.— On October 21, 1904, permission was obtained to examine the blood. The hæmoglobin, as estimated with Gower's hæmoglobinometer, was 25 per cent., but accuracy was hardly possible on account of the jaundice present. The red blood corpuscles numbered 1,840,000 per c.mm. Thus 0.68 may be taken as an approximate colour index. Dry films were stained by Jenner's and Leishman's methods, and also after heat fixation with Ehrlich's triacid mixture.

Plate I. shows a field as fairly typical as possible (Leishman's stain). There was not much tendency to rouleaux formation. As seen from the drawing, some poikilocytosis was present. The proportion of erythrocytes, whose size appeared markedly above the normal, was not so large as one might perhaps have been led to expect from the large number of megaloblasts present, not so many very large cells being seen in a field as is usual in, say, a moderately severe case of pernicious anæmia in an adult. Individual cells varied greatly in their staining reaction, many containing obviously a large proportion of hæmoglobin, while others were typical "ghost cells" (Plate II. a^5). Again, it may be noted that the colour index was a low one for the number of megaloblasts seen. Many cells—both among the erythroblasts and the erythrocytes—showed polychromatophilic staining (Plate II. a^3). Punctate basophilia was not infrequent (Plate II. a^2). Plate II. a^5 shows an "anæmic ring" in an erythrocyte. Cabot has described and figured such from films stained by Wright's modification of Leishman's method. He regards them as probably representing nuclear remains, but is unable to explain the red

staining. We are indebted to Dr Lovell Gulland for pointing out this cell. The resemblance to an imperfectly stained malarial parasite was striking, but the red colour was not so brilliant as that which the nuclear chromatin of the former takes on with the Leishman stain or other Romanowsky method. Among the erythroblasts, polychromatophilia was specially marked, being met with both in the mixed tints to which this term is more appropriately applied, and also in a purer blue staining (with Leishman's fluid) of the cytoplasm of some cells. The latter was found present in some cells whose nuclei, being in the resting stage, left no doubt as to the cells being really red blood corpuscles. Greater difficulty was experienced in assigning some of the cells in mitosis to their proper categories, *e.g.* that shown in Plate II. b^3 had a pale blue stippled protoplasm. It was at first thought that these were leucoblasts, but on a more thorough examination of the films one found transitional types between such and normally staining red blood corpuscles. An erythroblast in the anaphase of mitosis was seen whose cytoplasm had no such blue tinge, but was of a uniform pale yellow colour. (This cell has not been drawn, but compare Plate II. b^4.)

In making a differential count in film preparations of 500 leucocytes, 31 per cent. normoblasts and 14 per cent. megaloblasts were seen per 100 leucocytes counted. In distinguishing megaloblasts from normoblasts, the chief stress was laid on the more open chromatin network and lighter staining of the nucleus in the former. Of a total of twelve cells in division, seven were presumably megaloblasts and five normoblasts. Several cells appeared to be at a stage just before the telophase; in some it almost seemed as if the nuclei had passed into the resting state without the protoplasm participating in the division.

Examples of pathological mitoses were found in both of the two main forms described by Hansemann (2). In the cell —apparently a megaloblast—shown in Plate II. b^7, we have an example of that form in which the daughter-nuclei differ in size, either as the result of unequal distribution of the daughter chromosomes, or because some of the chromosomes are not drawn into the equitorial plate but are lost in the cytoplasm. In the other form the centrosome dividing abnormally, various

polyasters arise, and the process may go on to the production of a corresponding number of cells, or a single multi-nucleated cell may result. Such a process is exemplified in Plate II. b^5 —a quadraster (anaphase). On careful examination of this cell there seemed to be indication of a radial arrangement, as if from an attraction sphere near its centre. In Plate II. b^6, three nuclei, megaloblastic in type, in or passing into the resting stage, are found in one cell, the amount of whose cytoplasm is relatively small. The elongated shape of this cell may have been artificially produced, the film not having been fixed by the wet method. It is interesting to compare with this tri-nuclear cells figured in a recent paper by Moore and Walker (3). It is, of course, possible that some of the cells with double nuclei, etc., are the result, not of karyokinesis, but of direct division. We did not, however, come across any unequivocal instance of amitosis. Moore and Walker, in the paper just referred to, say that "amitosis is often resolvable, as in the case of leucocytes, into mitosis, which is, as it were, hurried over, its mitotic origin being still in evidence" (4).

White Blood Corpuscles. — These numbered 23,696 per c.mm., estimated with Thoma-Leitz apparatus, a correction being applied for the proportion of nucleated red cells present in films.

The following table gives the differential count of 500 leucocytes :—

Polymorphonuclear neutrophiles .	41.0 per cent.
Neutrophilic myelocytes . .	2.2 „
Polymorphonuclear eosinophiles .	2.5 „
Eosinophilic myelocytes . .	0.8 „
Coarsely granular basophiles .	0.6 „
Lymphocytes . . .	43.5 „
Large mononuclears and transitionals	9.4 „

The lymphocytes varied in size. The majority were somewhat larger than a red blood corpuscle, though not so large as the "large lymphocytes" common in acute lymphatic leukæmia. Their nucleus was round, oval, or slightly indented, but very marked irregularities in its contour were not common. A small rim of basophile cytoplasm surrounded the nucleus, and "budding of the basic zone"

was present in a few instances; but the protoplasm in general did not appear specially ductile.

2.2 per cent. of the total white blood corpuscles present were lymphocytes of specially large size, having a large round or indented nucleus, and a small rim of deeply basophile cytoplasm. While it is not always possible to differentiate lymphocytes proper from Ehrlich's large mononuclears and transitionals, we have endeavoured to restrict to the latter term very large cells, having a large amount of faintly staining cytoplasm and a pale oval or horse-shoe nucleus.

Among the myelocytes, some had typical neutrophilic, others undoubted eosinophilic granules; but in some the granules, while larger than the neutrophilic ones of ordinary polymorphs, were smaller than those usual to eosinophilic cells, and though of basophile reaction, were not stained metachromatically. It seemed to us that these might represent an undeveloped form of eosinophilic cell (5). A cell was seen which had large, coarse, basophile granules, with a few coarse eosinophilic ones interspersed (Jenner film).

An unusual type of cell was found in a film stained with Leishman's fluid. Two almost identical examples were seen on one slide, and there was nothing unusual about the rest of the film, which had stained very evenly, to suggest that their peculiar appearance had been artificially produced.

One is seen in Plate II. e^3. Their cytoplasm stained a deep blue black. It was difficult to distinguish a nucleus, but we supposed this to be represented by a paler area towards the middle of the cell. The cell was studded with what appeared to be eosinophilic granules, staining faintly, as they sometimes do, by Leishman's method. In one cell darker ill-defined patches were visible (developing granules?).

The suggestion was made that the supposed eosinophilic granules might be really due to patches of degeneration; but in one cell particularly (that figured) it was felt to be impossible to regard them as other than true granulations, and this view was corroborated by the finding in a Jenner film an eosinophilic myelocyte with bright red granules, and an unusually basophile cytoplasm.

On October 28 the blood was again examined, with the following result:—Hæmoglobin, 28 per cent. Red blood

corpuscles, 1,376,000. Colour index, 1+. White blood corpuscles, 27,868. Twenty-two nucleated reds were seen in counting 100 leucocytes.

Differential count of leucocytes :—

Polymorphonuclear neutrophiles	35	per cent.
Neutrophilic myelocytes	4	,,
Lymphocytes and large mononuclears	59	,,
Eosinophiles (some myelocytes)	1	,,
Basophiles	1	,,

The maternal blood, also examined on this date, showed : —Red blood corpuscles normal. White cells, 6800. Hæmoglobin, 85 per cent. Polymorphonuclear neutrophiles, 68 per cent. Lymphocytes, 29 per cent. Eosinophiles, 3 per cent.

On November 4 the infant's blood was again examined : —Red blood corpuscles, 1,960,000. White cells, 15,797.

Differential count :—

Polymorphonuclear neutrophiles	31.0	per cent.
Neutrophilic myelocytes	1.2	,,
Polymorphonuclear eosinophiles	4.0	,,
Eosinophilic myelocytes	0.2	,,
Coarsely granular basophiles	0.2	,,
Lymphocytes	54.6	,,
Large mononuclears and transitionals	8.8	,,

Eighteen normoblasts and 20 megaloblasts seen per 100 leucocytes counted.

On November 11 the hæmoglobin was 43 per cent. Red blood corpuscles, 2,816,000. Colour index, 0.76. White blood corpuscles, 9830. The polymorphs were now 38 per cent., the lymphocytes 62 per cent. Eighteen nucleated reds were seen in counting 100 leucocytes, the proportion of megaloblasts and normoblasts being equal.

On July 24, 1905, the hæmoglobin had risen to 76 per cent., the red blood corpuscles to 4,290,000. Colour index, 0.89. White blood corpuscles, 10,400. A trace of poikilocytosis and granular basophilia was observed.

Differential count :—

Polymorphonuclear neutrophiles .	37.6	per cent.
Lymphocytes . . .	51.0	,,
Large mononuclears and transitionals	9.8	,,
Eosinophiles . . .	1.6	,,

One of the writers of this paper has been for some years in the habit of examining the blood of infants at birth, a film being taken from the umbilical cord. It chanced that among the cases examined in this way was the first child born in the family of which the case recorded above was the second member. Nothing was noticed about the first child suggestive of blood disease, and a complete examination of the blood was not made. The films examined presented no obvious abnormality in the cells, and did not indicate the presence of an unusual number of leucocytes.

The following differential count of 500 white cells was made :—

Polymorphonuclear neutrophiles .	54.2	per cent.
Neutrophilic myelocytes . .	0.4	,,
Lymphocytes . . .	40.4	,,
Large mononuclears and transitionals	3.4	,,
Eosinophiles . . .	1.4	,,
Basophiles . . .	0.2	,,

Three normoblasts were seen per 100 white cells counted. While the blood in the second infant was not examined at birth, the clinical symptoms left no doubt as to the abnormal condition of the blood being congenital, even unskilled attendants being at once struck with the remarkable pallor.

We have not been able so far to find in medical literature full records of a case corresponding to that just described.

An anæmia so profound with (at one stage especially) a high colour index and a large number of megaloblasts would, in an adult, at once suggest the diagnosis of pernicious anæmia, although the leucocytosis present would require some explanation. But in considering a similar condition in a young infant, one has to bear in mind that the patient has not long passed a period of development when the normal form of blood production is megaloblastic in type, and that a reversion, more or less complete, to this type, can occur much more readily than

it would do in an adult, and consequently may not have the same significance.

The possibility of our case being one of lymphatic leukæmia was considered. But while the unusual number of erythroblasts might have been found referable to the age of the patient, the correctness of such a diagnosis seemed very improbable in view of the comparatively low total and relative lymphocyte counts.

The number of myelocytes was too low for even "acute" spleno-medullary leukæmia, supposing that one allowed that some of the cells counted as lymphocytes were really marrow cells, the "lymphoid" precursors of myelocytes. The case showed more points of similarity to what Von Jaksch has designated *anæmia pseudoleukæmica infantum*. Without entering into the question of whether this is entitled to be regarded as a disease *sui generis*, or is simply the form in which anæmia of varied origin manifests itself in infancy, one was struck with several points of resemblance between the condition V. Jaksch has described and our case—the enlargement of the spleen, the leucocytosis, and especially the polymorphic character of that leucocytosis, the severe anæmia with poikilocytosis and the presence of many erythroblasts, and the virtual recovery of the patient (6).

Cases of jaundice appearing at or shortly after birth, sometimes associated with anæmia, and occurring in successive members of a family, have been recorded by Arkwright (7), Ashby and Wright (8), Auden (9), and Busfield (10). In three of these series the first child born was free of symptoms, while the later members of the family suffered, many but not all of the cases ending fatally. In one series the first two children had no jaundice. Dr Auden thus summarises the main points in his own set of cases, with which the other series agree, more or less, at least as regards the jaundice: "1. The appearance in successive children of the same parents. 2. The rapid development at, or a few hours after birth, of a jaundice, which quickly became profound. 3. The occurrence of a generally drowsy condition, which usually ended in convulsions, terminating fatally. 4. The severe anæmia, which became more and more marked as the colour of the jaundice waned, and which persisted for a lengthy period in those affected children which survived. 5. The 'hæmatogenous' character of the jaundice

[as ascertained from post-mortem examination], and absence of any form of hæmorrhage."

In one of Dr Auden's cases, blood films taken after death gave no definite results, but appeared to show a considerable increase in the proportion of white cells. In another, films taken from the umbilical cord at birth appeared to indicate an increase in the large mononuclear leucocytes. (Permission for a full blood examination was refused.) A similar increase obtained in films taken from the blood in heart at the *sectio* of another child, where it was found that the liver cells showed extensive fatty degeneration and a considerable infiltration of small round cells, the general aspect of the section suggesting an acute toxæmia. In other cases the post-mortem examination did not throw much light on the condition.

The question naturally suggests itself as to whether some of these cases might not have shown a state of the blood similar to that in our own patient. Dr Auden considers it most probable that "the disease is an example of an acute toxæmia, due to some profound chemical disturbance rather than to the products of bacterial infection."

In our case also, in the absence of other explanation, such a view seems not unlikely to be the correct one. The enlargement of the spleen and lymphatic glands, the jaundice, the leucocytosis, and profound anæmia—all of which virtually passed off—tally with the supposition. Such a view might help to explain the presence of some of the unusual cell forms referred to above. Perhaps what struck one as the most remarkable feature in the case was the occurrence, in a patient who recovered, of cellular types usually associated with fatal disorders of the blood.

Leucocytes with mixed granulations we have elsewhere met only in leukæmia, though one of us has examined a large number of films taken from umbilical cords and stained with alcoholic solutions. In a case diagnosed as splenic anæmia of infancy, and recorded by R. Hutchison (11), it is noted that some of the large round cells present had often fine basophile granulations and some mixed granulations. The patient died. Pathological mitoses are seen occasionally in the more profound affections of the hæmopoietic system. In the above mentioned series of films from umbilical cords no example was seen,

although erythroblasts are a normal constituent of the blood of the newly born infant, and occasionally one has come across a mitotic figure. It may be noted that pathological mitoses have been produced experimentally by the action of chemical substances. Galeotti caused the asymmetrical form to appear in salamanders by this means, and the multipolar form has also thus been artificially produced. It is possible that their occurrence in cancer is due to chemical products of that disease (11).

Under the epithet of "Reizungsformen," Türk has described non-granular cells, whose protoplasm, he says, far surpasses that of all other cells known to him in basophile affinity (13). Weil has called these "non-granular myelocytes." Such cells are met with as the result of "stimulation" of the marrow in leucocytoses of long duration and in cachectic anæmias (conditions associated with toxæmia). While we did not come across cells of this description in the case, it occurred to us that possibly the cells with eosinophilic granules and intensely basophile cytoplasm (Plate II. e^3) might be granular analogues. The erythroblasts with basophile stippled cytoplasm and little or no indication of the presence of hæmoglobin are of interest in view of the theories which trace the origin of white and red blood corpuscles alike to a parent "lymphoid" cell.

The blood of the mother was unfortunately not examined till some weeks after the birth of the child, but although it was then found nearly normal so far as histology goes, and though no special symptom had been noticed during the pregnancy suggestive of the presence of a toxic process, this can scarcely be taken as excluding the possibility of a toxæmia originating on the maternal side. Conditions depending on development and immunity might be entirely different in mother and child.

While making these suggestions, we do not consider that the data in hand from this case alone, and in the absence of post-mortem examination, justify any dogmatic statement as to the pathology of the condition.

In conclusion, we desire to express our warmest thanks to Dr Lovell Gulland for seeing the case with us, and making blood counts on several occasions, and also for much valuable help. Our thanks are also due to Dr Stewart Fowler, who also kindly came to see the case with us and made an independent

examination of the blood. We are indebted to Mr Richard Muir, of the Pathological Department of the University of Edinburgh, for the trouble he has taken in executing the drawings.

References.

1. Richard Cabot. *Journal of Medical Research*, vol. ix. p. 15.

2. D. Hansemann. "Die mikroskopische Diagnose der bösartigen Geschwülste," Berlin, 1902, pp. 92-95.

3. E. Moore and C. E. Walker. "The maiotic process in mammalia." *Thomson Yates and Johnstone Laboratories Report*, vol. vii. 1906; plate i. figs. 33 and 34.

4. *Ibid.* p. 78.

5. Carl Hamilton Browning. "Observations on the development of the granular leucocytes in the human fœtus." *The Journal of Pathology and Bacteriology*, vol. x. pp. 148-150.

6. A. Monti and E. Berggrün. "Die chronische Anaemie in Kindesalter," pp. 69-71.

7. Arkwright. *Edinburgh Medical Journal*, vol. xii. 1902, p. 156.

8. Ashby and Wright. "Diseases of Children," 5th edition, 1905, p. 29.

9. G. Auden. "A series of fatal cases of jaundice in the new born occurring in successive pregnancies." *St Bartholomew's Hospital Reports*, vol. xli. 1905, pp. 139-142.

10. J. Busfield. *British Medical Journal*, 1906, i. p. 20.

11. R. Hutchison. "Goulstonian lectures on some disorders of the blood and blood-forming organs in early life." Table opposite p. 30. Reprinted from *Lancet*, March 1904.

12. E. Wilson. "The cell in development and inheritance," pp. 68-70.

13. W. Türk. "Vorlesungen über klinische Haematologie," 1904, p. 369.

Description of Plates.

PLATE I.—Blood film, stained by Leishman's method, taken on October 21, 1904.

Objective: Leitz homogen. Immersion, $\frac{1}{12}$. N.A., 1.30.
Ocular: Zeiss compensating, 4.
Magnification, 520 diameters.

PLATE II.—Selected cells, stained by Leishman's method.

Objective as above.
Ocular: Zeiss compensating, 8.
Magnification, 1040.

(*a*) Erythrocytes: (*a*) Normal.—(1) Microcyte; (2) with punctate basophilia; (3) with polychromatophilia; (4) "ghost cell"; (5) with "anæmic ring."

(*b*) Erythroblasts—(1) Normoblast; (2) megaloblast; (3) in mitosis with stippled protoplasm; (4) megaloblast with two nuclei;

(5) pathological mitosis, multipolar type; (6) three nuclei in one cytoplasm; (7) pathological mitosis in megaloblast, type with unequal division of chromatin.

(*c*) Neutrophilic myelocyte.—(1, 2, and 3) Polymorphonuclear neutrophiles.

(*d*) (1) Lymphocytes; (2) large mononuclear; (3) transitional cell.

(*e*) (1) Eosinophilic myelocyte; (2) eosinophilic polymorph; (3) granular cell (Reizungsform?).

NOTE ON A FURTHER TRIAL OF PROFESSOR DUNBAR'S HAY FEVER ANTITOXIN SERUM (POLLANTIN)

By PHILIP G. BORROWMAN, M.D.,
Crieff

SINCE the date of my previous note on this subject (*Scottish Medical and Surgical Journal*, September 1903), my experience with Pollantin has been as follows:—

In 1904 my first attack of hay fever was on 11th June. I instilled a drop of Pollantin into each eye, which gave relief, and I remained free from hay fever during the rest of the day.

12th June.—I put a drop in each eye at 9.20 A.M. Hay fever was threatening, but did not actually come on.

13th June.—I had an attack of sneezing while dressing. I put Pollantin in both eyes and in my right nostril, and I remained well all day.

14th June.—At 10 A.M. I put Pollantin in both eyes and nostrils. At 11 A.M. I had slight hay fever, while driving in the country, but it passed off. After returning home the right inner canthus was very itchy. I instilled Pollantin, but did not get relief for nearly an hour.

15th June.—I forgot to put Pollantin in my eyes in the morning, but I had no hay fever, although driving in the country, till 5.30 P.M., when I had a slight attack, which was relieved at once by the instillation of a drop of Pollantin into each eye.

16th June.—I omitted to use Pollantin in the morning, but remained quite well while out driving. In the afternoon and evening I had bad asthma.

17th June.—I had to sit up all night with asthma. I had

an attack of hay fever while driving in the country. An instillation of Pollantin on getting home gave relief.

18th and 19th June.—I had bad asthma day and night, but no hay fever to speak of.

20th June.—The asthma was better, but still troublesome. At 9.45 A.M. I put Pollantin in both eyes as a protection. I had some hay fever while driving. I put Pollantin in my right eye at 12.45 and the hay fever passed off. In the afternoon my nostrils were blocked by swelling and very uncomfortable and the asthma was rather bad. I slept pretty well at night, of course sitting up, as I always have to do during the asthma time.

21st June.—I had hay fever after driving, but Pollantin gave relief. The asthma was very bad in the afternoon and evening.

22nd June.—I had bad asthma day and night, but no hay fever worth speaking about.

23rd June.—I was getting so worn out with the asthma that I took a holiday and went to sea, where I soon recovered.

6th July.—The steamer put into Aberdeen, and I had an attack of hay fever. I therefore instilled Pollantin, after which my eyes were *worse.*

7th July.—I came home and had a little asthma, but no hay fever.

9th July.—I had slight hay fever after driving. I instilled Pollantin, after which my eyes got *much worse.*

After this I had no more hay fever, though the asthma continued off and on till the beginning of September.

In the following year, 1905, I was put against Pollantin by the fact of its having been patented, and I tried other remedies. I only used Pollantin once that summer, when my eyes were not bad, and it brought on a violent attack of hay fever.

This summer, 1906, I got a fresh supply of Pollantin, as it certainly seemed to me that in 1904 when I used it in the morning before going out I had less hay fever.

21st June 1906.—I had been having a little hay fever, but it had passed off. As I intended to go out into the country I used the fresh Pollantin, and the following are the notes I made (with some difficulty !) on the result :—

4.45 P.M.—Instilled one drop of Pollantin into right eye.

4.47.—Violent hay fever in right eye and almost immediately afterwards in right nostril also.

4.50.—Very acute conjunctivitis, and feeling of rawness and swelling of soft palate on right side.

5 P.M.—Great œdema of both palpebral and sclerotic conjunctiva. Not much pain, but intense discomfort in eye. I forcibly separated the lids and washed out the conjunctiva with warm water, as well as I could. The sclerotic conjunctiva had an appearance like bullæ, raised $\frac{1}{8}$ inch above the level of the cornea.

5.10.—Great discomfort in soft palate and pain on swallowing, with choking sensation.

5.15.—Tried to douche right nostril, but could not as it is quite blocked.

5.27.—Conjunctiva does not feel quite so bad, but still great œdema; can't separate lids at all.

5.35.—Discharge of ʒiii or ʒiv of jelly-like mucus from posterior nares. The soft palate still feels raw and sore.

5.45.—An hour after the instillation, eyelids still so œdematous I can't open my eye. Watery discharge from right nostril as in bad hay fever. The soft palate, uvula, and fauces are œdematous.

6 P.M.—Not much change—can't open right eye yet. Copious watery discharge from right nostril, which is still blocked, but not absolutely. Raw feeling of posterior nares and pharynx of right side, with œdema.

6.30.—ʒii more jelly-like mucus discharged from posterior nares.

7 P.M.—Œdema of eyelids less. Can now open eye a little. Conjunctiva still bullous.

8 P.M.—Still decreasing, palate still œdematous.

10 P.M.—Clearing up gradually. Eyelids still much swollen. Palate less œdematous, but still very uncomfortable.

11.30.—Still much œdema of conjunctiva and eyelids, also of soft palate, but it has not spread to glottis yet. As I could not read, I went to bed and slept till 1.30 A.M. (22nd June), when I woke with asthma. My ordinary remedies relieved this in an hour, and I slept again till 6.30. A pretty good night for me at this time of year.

8 A.M.—The right conjunctiva still œdematous and the

eyelids swollen. Palate nearly all right, but rather uncomfortable.

The left eye and nostril remained normal throughout. I had been having slight asthma all day, and it was neither better nor worse after the instillation of the Pollantin.

My chief anxiety, when the œdema spread downwards, was that it would attack the glottis. My friend Dr Haig kindly remained within call by telephone, prepared to perform tracheotomy if necessary.

The right conjunctiva has not yet (27th June) returned to its normal condition, and I have had several sharp attacks of hay fever in both eyes and nostrils.

I offer no opinion as to whether the Pollantin I got in 1903 and the early part of 1904 is the same as that now obtainable. I am merely stating the facts.

I do not propose to experiment any more with Pollantin. I have had enough. The remainder of my supply was boiled and then poured down the drains!

INTUSSUSCEPTION: IS INFLATION JUSTIFIABLE?

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MY experience of intussusception has been unusual, because two-thirds of the cases I have seen have been in adults. An enormous majority of those mentioned by the writers in the last number of this Journal occurred in infants, and it is well known that, as a rule, the course of the disease is much more acute and severe in them than in later life; so I approach the question from a somewhat different point of view—the more so as I have had results from inflation better than any to which they refer. I have therefore asked the Editor to allow me to record my experience and describe my method. I have included all the cases I have seen (so far as I can remember), which fall under either of these heads.

CASE I. My first case occurred in 1887, when a middle-aged lady presented symptoms of obstruction, very gradual and

insidious in onset. A definite diagnosis was not made for some days; on the tenth day inflation was attempted with the contents of a soda water syphon, as described in Treves's "Intestinal Obstruction."[1] No relief was obtained. She was seen by Dr (now Sir) Patrick Heron Watson, and by the late Dr Brakenridge, who both agreed with my diagnosis. There are half a dozen diagrams in my notes to show the varying situation, size, and shape of the tumour, which became very conspicuous in the later stages of the case. She lived three months, with gradually increasing pain and sickness, and died from exhaustion.

CASE II. The only case I have had in an infant occurred on 26th May 1889. The onset was a typical one, very acute and severe; but I was sent for immediately, and the symptoms yielded readily within an hour to chloroform, injection of water, and inversion.

CASE III. A lady of 60 had, on 11th October 1891, sharp pain on waking in the morning, followed by much vomiting. There was a small, hard lump in the region of the gall bladder. Morphia administered. On the 12th, much paroxysmal pain and vomiting. Lump much larger, very tender, elongated, below and parallel to the margin of the liver. I observed in the house a "seltzogene," and thought it would serve the purpose of inflation much better than an ordinary syphon. Colon thrice inflated in the evening; sharp pain each time. Tumour gone; pain and tenderness very greatly relieved. On the 13th, return of pain; but of a different character, less severe, more constant, and not relieved by inflation. This proved to be due to fæcal impaction, which yielded to olive oil enemata. Subsequently she had several attacks of fæcal impaction in the same region, but without anything to suggest intussusception. She died in 1895 from malignant tumour in the right hypochondrium; exact cause not ascertained.

CASE IV. A delicate lady, 34, had once had severe peritonitis, and was subject since then to occasional attacks of abdominal pain. On the evening of the 31st October 1892

[1] Edition of 1899, p. 511.

she was seized by sudden violent pain in the abdomen, more severe than ever before, but not distinctly localised. Much collapse; much vomiting. No tumour felt. Morphia administered. November 1st.—Pain and vomiting controlled only by morphia. In the evening inflation; no result. Some blood-stained mucus passed per rectum. November 2nd.—Much in the same condition. In the evening inflation was repeated, causing sudden localised pain above pubes, followed by great relief. No more morphia was required; rapid recovery followed.

CASE V. A boy, aged 11, was seized on 11th July 1896, about 6 P.M., with sudden pain in the right side of the abdomen. Localised tenderness from the liver to the right iliac fossa. Repeated vomiting, followed each time by temporary relief. The symptoms continued after stomach and bowels were empty. Sleep restless and broken; pulse quick and small. Colon thrice inflated at 2 A.M. on the 12th. Sharp pain, followed by great relief; the pulse improved and sleep was sound and quiet. Vomiting continued at longer intervals till noon, but without any other bad symptom. Recovery rapid.

CASE VI. A lady of 27, very energetic but not very robust, had been out of sorts for some days. She was in bed about 10 P.M. on the 8th September 1902, when severe pain and vomiting began. I saw her shortly after midnight on the 9th and found her looking very distressed, with tenderness and increased resistance on the right side of the abdomen; vomiting was continuing at short intervals. Dr Gulland saw the patient with me, and in his presence, about 2 A.M., I inflated the bowel. Immediate relief. Uninterrupted recovery.

It will be seen that a tumour was found in only one of these four cases (Nos. 3-6). It must be remembered, however, that no anæsthetic was administered, and in all reflex contraction of the abdominal muscles interfered more or less with palpation. In each case the consultant (see Table I.) agreed with me that intussusception was the most probable diagnosis. Each of the patients was certainly seriously and alarmingly ill; and in each case the relief afforded by inflation was immediate and

most striking. Though this result tends so far to confirm my diagnosis, it is not sufficient to establish it; for I believe that intussusception is not the only condition leading to obstruction which may be relieved by inflation.

This was the consideration which determined me to use the method in the three cases which follow, in which a precise diagnosis was not arrived at before inflation was used.

CASE VII. A very delicate lad of 17, undergrown and with a severe Potts' curvature of long standing, had sickness and giddiness from the 22nd June 1897. On the 23rd he appeared to be suffering from a "bilious attack." On the 25th he had had no motion in spite of castor oil; was much worse, obviously distressed, still vomiting; and his abdomen was tender, especially in the epigastrium and the left flank. 8 P.M.—Inflation; tenderness seemed slightly diminished. 10 P.M.—As vomiting still persisted, inflation was repeated; the pulse fell from 120 to 108 and became stronger; the boy expressed himself as feeling easier. He had, however, a very restless night, though vomiting and tenderness were rather less. 26th.—Inflation repeated, with no definite result. He became weaker, and died the following afternoon (27th). Post-mortem.—Nothing found to account for the symptoms except distension of the intestines, both large and small.

Inflation did not appear to increase, except momentarily, the distension of the abdomen; it was tried on the chance of some reducible condition being present, though with little hope of arresting the downward progress of a very bad case.

CASE VIII. (seen for Dr T. B. Darling). On the 9th June 1899 a young man of 18 was seized about 8.30 P.M. with griping pain in the lower abdomen, which became rapidly worse. I saw him about 11 P.M., very severely pained and excessively restless. A large enema relieved for a short time. On the 10th, about 1 A.M., inflation; considerable relief, but only for about a quarter of an hour. He was seen by Dr Darling about two hours later, and admitted to the students' ward in the Infirmary, where Mr Alexis Thomson operated about 9 A.M.; more than half of the small intestine was found

strangulated by a band. He never fully recovered from shock, and died about twenty-four hours after the onset.

CASE IX. In the early morning of the 17th January 1900, a young man aged 22 was seized by severe abdominal pain and nausea. Enemata failed to relieve him, and his condition became worse. No signs warranting a precise diagnosis could be made out. Inflation; considerable relief. Rapid recovery.

In the following case the seltzogene method was employed merely as an aid to diagnosis:—

CASE X. A lady of 66 had suffered much when young from constipation. For about six months she had had great trouble in maintaining the action of the bowels, and had suffered from pain in the back and the left side. There was a tender lump in the left hypochondrium. In consultation with Mr Caird (June 1897), inflation was used; the colon filled with gas as far as the lump, but no further. This result strengthened our suspicion of malignant disease of the colon, and operation was advised. The lump, however, was found to be the left kidney, which was between the layers of the meso-colon. It was removed and the patient made a good recovery.

The great majority of the writers who give favourable consideration to inflation or irrigation of the bowel in intussusception express the opinion that the fluid or gas should be introduced *slowly*.[1] I believe on the contrary that the chances of success are very greatly increased by a *sudden* distension of the bowel. Gradual distension excites the affected part to contract before the distending force has become effective, and this contraction must be allowed to pass off, or must be overcome, before reduction can take place; for it is generally agreed that peristaltic action tends to aggravate the condition in the vast majority of cases. A graphic account of this reflex opposition to reduction is given by Lawford Knaggs[2] as follows: "At midnight, therefore, on Nov. 14th" (four and a half days after the commencement of symptoms), "he was put under A.C.E. mixture, and inflation was performed with a Higginson's syringe. As

[1] See *e.g.* last number of this Journal, pp. 142, 188.

[2] *Lancet*, 1897, vol. i. p. 9.

CASES OF ACUTE OBSTRUCTION TREATED BY INFLATION WITH SELTZOGENE

TABLE I. Cases diagnosed as intussusception before inflation.

No.	Sex	Age	Duration of Symptoms before Inflation	Relief after Inflation	Seen in Consultation with	Result
3	F.	60	36 hours 48 „	Yes No	Dr Brackenridge (after inflation)	Cured
4	F.	34	24 „ 48 „	No Yes	Sir Halliday Croom (after inflation)	Cured
5	M.	11	8 „	Yes	Mr Alexis Thomson (after inflation)	Cured
6	F.	27	4 „	Yes	Dr Gulland	Cured

TABLE II. Cases where precise diagnosis was doubtful before inflation.

No.	Sex	Age	Duration of Symptoms before Inflation	Relief after Inflation	Seen in Consultation with	Result
7	M.	17	* * *	Slight Yes No	Mr Wallace	Died
8	M.	18	4½ hours	Slight	Dr Darling Mr Alexis Thomson (after inflation)	Died after laparotomy
9	M.	22	24 „	Yes	... ...	Cured

* Onset gradual: time cannot be accurately stated.

this proceeded, and the large intestine became distended, the tumour was excited to very powerful peristalsis. It gradually appeared as a curved mass with one extremity above and to the right of the umbilicus, and the other dipping down into the left lumbar region. It stood up on the surface of the

abdomen as a sharply defined, firm, bossy swelling of considerable elevation. Its length was quite six inches, but it was subsequently found that the whole of the tumour could not have been visible. As inflation progressed its only effect was to make the mass stand up more vigorously; so it was discontinued, when the swelling gradually faded away. After the usual preliminaries the abdomen was at once opened . . ." and, after reduction, the patient made a good recovery.

The latent period of unstriped muscle is very much longer[1] than that of voluntary muscle, and if inflation is sudden, the intestine may be distended and the pressure brought to bear upon the intussusception before reflex action takes place. When irrigation with water is employed, such rapid distension is clearly impossible. I have been accustomed to compare sudden inflation of the intestine to the well-known method of reducing dislocations of the shoulder by taking the patient unawares, while the muscles are relaxed.

But besides this *physiological* advantage of rapid inflation, there is a *physical* advantage, which, though of less importance than the former, also deserves consideration. In all questions of strength of materials, from steel rods to bowel tissue, time has an important influence. A cord, for instance, may support a weight for a short time, which, if continuously suspended from it, will at length lead to its rupture. This point was worked out by James[2] with regard to the small intestine of the sheep, treated (*mutatis mutandis*) as a cord; and he found that, if t be the weight which will cause rupture at once,

"$\frac{2}{3}$ t will cause rupture in about 8 minutes.
$\frac{7}{12}$ t will cause rupture in about 44 minutes.
$\frac{1}{2}$ t will cause rupture in about 247 minutes."

[1] Authorities are very vague on this point. The only definite estimate I have found of the period is that given by Starling ("Elements of Human Physiology," 1904, p. 149), who says: "The latent period may be from 0.2 to 0.8 second." My friend, Professor Noël Paton, however, points out to me that the time-interval of importance here is "*not* the latent period of visceral muscle, but the latent period of reflex action of the viscus:—a much more complicated question, on which I can recall no definite work. Living in the country, as I am doing just now, I am unable to find out for you what has been done" (private letter). The latter interval is obviously a longer one than the former.

[2] *Journ. of Anat. and Phys.*, 1878-9, vol. xiii. p. 160.

We see then that a short application of a pull can be borne practically without injury, which, if long applied, will lead to rupture. A similar law, doubtless, holds good with regard to a distending force; that is, a pull acting simultaneously and equally in all directions along the wall of the intestine. When, therefore, the intestine is rapidly distended, a very much greater pressure can be safely used than if the distension is slow.

The oft-quoted[1] experiments of Mortimer[2] and Mole[3] were all performed with water, and the distension of the intestines was necessarily slow. Their results, therefore, cannot be taken as deciding what pressure it is safe to use in the case of rapid distension.

I hoped to have some decided results of experiments performed by rapid inflation on the cadaver to throw light upon this point. The time at my disposal has, unfortunately, not allowed the experiments to advance beyond a tentative stage, and the results given are merely preliminary. I have thought it best, however, to include them in the paper, fragmentary as they are (*vide* Table III.). I have had much valuable assistance in devising and setting up my apparatus from one of the patients whose cases are recorded in this paper. I must also express my indebtedness to those in charge of the post-mortems at the Infirmary and the Longmore Hospital for most kind and willing help.

A mercurial manometer and a stopcock were attached to the tube leading from the seltzogene to the bowel. When the colon was to be inflated in the closed abdomen, it was washed out beforehand as in the living subject. Gas was allowed to escape from the seltzogene, and the abdomen was found to fill rapidly. In the cadaver the safety-valve action of the anus (*vid. infra*) is wanting; I had a tapered nozzle held in position by an assistant, and the pressure he exercises is, of course, a much more powerful obstacle to the escape of gas than the living sphincter. I do not believe such dangerous pressure could be attained by my method in the living body as in case 4.

[1] See, *e.g.* D'Arcy Power, *Brit. Med. Journ.*, 1897, vol. i. p. 453; Treves, *loc. cit.*, p. 503; *Journal loc. cit.*, p. 143.

[2] *Lancet*, 1891, vol. i. p. 1144.

[3] *Bristol Med.-Chir. Journal*, March 1894, vol. xii. p. 65.

TABLE III. Experiments on gaseous inflation of colon after death.

				Inflation—*a.* Before opening Abdomen			*b.* After opening Abdomen		
No.	Sex	Age	Cause of Death	Body examined (hrs. after death)	Maximum Pressure (ft. of water)	Damage to Colon	(Hours after death)	Maximum Pressure (ft. of water)	Damage to Colon
1	F.	33	Chronic Phthisis.	27	(Entire Colon.)		77	2	Cæcum gave way by peritoneum splitting longitudinally; gas escaped through small openings beneath these fissures.
1	,,	,,	,,	,,	(Lower half of Colon.)		,,	3	Lower part of colon gave way as above.
2	M.	45	,,	25	...		52	1.7	Coats gave way opposite attachment of mesentery, and tissue of mesentery became emphysematous.
3	F.	51	Fungating and sloughing Carcinoma of mamma. Septicæmia.	36	12	nil	36	4.7	Small round hole in cæcum.
4	M.	44	Acute pneumonia.	37	11	Extensive longitudinal splitting of peritoneum; a small leak beneath one of the splits in cæcum.			
			There were numerous chronic tuberculous ulcers in the Colon in Cases 1 and 2; but in neither of the cases did any of them give way.						

Dunbar, in the Journal,[1] following previous writers, lays much stress upon the danger of rupture of the intestine by inflation or injection. *The only PROOF he gives that this accident has ever happened* is the statement that "Lawford Knaggs collected seven cases in which rupture of the bowel from the introduction of air or water had caused death." That was nineteen years ago[2]; much intestine has passed out of the intussuscipiens since then, and our point of view has considerably altered. It seemed to me it would be worth while to scrutinise afresh these cases whose skeletons, after all these years, are hung up like scarecrows, to frighten everyone except the laparotomist from the field of intussusception; particularly as Treves,[3] more cautious than Dunbar, speaks of them merely as "seven cases in which rupture of the bowel took place." The result of a reference to the original authorities will be found in Table IV.

It will be seen that cases 4 and 6 are too vague to prove anything. In cases 2 and 7 (inflation after 7 days) and case 3 (injection after 64 hours) the treatment does appear to have at least hastened death. Can we wonder at it? Were early laparotomy (and it is only *early* treatment any of us think hopeful, and consider it much worth while to argue about) to be arraigned because of disasters after 7 days, or even 64 hours, what a damning indictment could be brought against it! As Dunbar well puts it,[4] "such cases must not be included in statistics used to contrast the advantages of the two methods."

There remain only cases 1 and 5. In each of these inflation was done fairly early, and the periods the infants lived after these early inflations prove, I think, that the perforation was not caused by them in either case. These two cases, in fact, demonstrate not the *danger*, but the *safety*, so far as perforation is concerned, of *early* inflation. As of old, Balaam is invoked to curse; but lo! what was to have been a curse turns to a blessing!

The only important paper I know on rapid inflation of the bowel is that by von Ziemssen on "Artificial Inflation of the Large Intestine."[5] He describes his method, which consists

[1] *Loc. cit.*, pp. 143-4.
[2] *Lancet*, 1887, vol. i. p. 1125.
[3] *Loc. cit.*, p. 504.
[4] *Journal, loc. cit.*, p. 145.
[5] *Deutsche Arch. für klin. Med.*, vol. xxxiii., 1883, Doppelheft 3 and 4, p. 235.

TABLE IV. Cases collected by Lawford Knaggs of perforation after inflation or injection.

No.	Age	Sex	Date	Time after Onset	Method	Course after last recorded Inflation or Injection	References
1	6 mo.	M.	1873	Under one day. "Next day."	Oil injected. Chloroform. Inflation. Oil again. Inflation.	"Soon terminated fatally."	Bryant, "Harveian Lectures," *Brit. Med. Journ.*, 1884, vol. ii. p. 1004. Case XVII.* Fagge&Howse, *Med.-Chir. Trans.*, 1876, vol. lix. p. 97*
2	5 mo.	M.	1884	7 days.	Inflation	Laparotomy: "too exhausted to recover." Died 9 hours later.	Knaggs, *loc. cit.*, says: "not published." See also pp. 1177 and 1179.
3	5 mo.	M.	1886	64 hrs.	Water injected.	Died 1½ hours later.	Thomas, *Lancet*, 1886, vol. ii. p. 1219.
4	?	?	?	?	?	?	*Brit. Med. Journ.*, 1881, vol. ii. p. 900. I quote the *entire* record.
	"Dr Tyson related a case" (presumably of intussusception) "where oil was found after death in the abdominal cavity."						
5	7 mo.	F.	1871	10 hrs. (about) Next day.	Inflation. Injections.	Lived 4 days after injections.	Bryant, *loc. cit.*, Case XVIII. Fagge&Howse, *loc. cit.*, p. 98.
6	7 mo.	M.	1880	?	Inflation.	Lived at least 1 day.	Bryant, *loc. cit.*, Case XVI.
7	7 mo.	M.	1878	7 days.	Inflation.	"Became collapsed and convulsed, and died."	Bryant, *loc. cit.*, Case XIX.

* These records do not quite agree. I have followed the fuller of the two.

in pouring into the rectum successively solutions of sodium bicarbonate and tartaric acid, and allowing the evolution of gas to take place *in situ*. He discusses various conditions in

which the method may be used for purposes both of diagnosis and of treatment, and gives from his own experience, evidently a varied and extensive one, a number of illustrative cases in which it had proved useful. Singularly enough, the subject of intussusception is not once mentioned in the paper! The cases quoted are all in adults, and one must suppose it is upon experience in adults that his opinions are based. He expresses himself as follows:—[1]

"Theoretically, any affection would contra-indicate this procedure which diminishes the resistance of the intestinal wall and so renders it liable to rupture. In practice, however, this contra-indication does not exist, except in typhoid fever and in tuberculosis of the bowel; at least in my frequent inflations, though fæcal ulcers, cancerous ulcers, etc., were present, I have never seen the least injury follow the procedure. Besides, the normal large intestine resists enormous pressure. I have tried, in the fresh and still warm cadaver, to make the colon burst by excessive distension with carbonic acid and mechanical compression, but I have never succeeded. In the living body, as my experience teaches, one need not be anxious about a perforation."

The seltzogene affords the means of attaining practically the same result as Von Ziemssen's method, and, in my opinion, much more conveniently.[2] In order to use it, it is necessary to charge the upper chamber only, and in such a way that the evolution of gas has not far advanced when the tap is screwed in; *e.g.* by using the tartaric acid of the charge *in large crystals;* or, better still, by using the tap without its long glass tube (see Fig). A rubber tube must be firmly attached at one end to the tap of the syphon, and at the other to an ordinary rectal nozzle. The patient's bowels should be cleared by an enema, and I have found that the bowel can be distended and allowed to empty, several times in quick succession if desirable, without disturbance from escape of fluid.

This is, of course, a rough and ready method. The pressure in the "3-pint seltzogene" I have used when freshly charged is about 5 atmospheres; but it could be accurately adjusted to any amount desired by calculating the necessary charge. The

[1] *Loc. cit.*, p. 245.

This method was first published in the *Edin. Med. Journal*, June 1893, vol. xxxviii. p. 1146. See also *Lancet*, 1897, vol. i. p. 1680.

pressure attained during inflation of the intestine can be observed, as in my experiments, by fitting a pressure-gauge to the apparatus. I do not think either of these expedients would have assisted me in the treatment of my cases. I have found it quite a sufficient guide to watch the patient, while one hand was laid on the abdomen and the other controlled the tap of the seltzogene.

The administration of an anæsthetic I consider not only unnecessary, but most undesirable. When pain is produced it may be sharp, but it is only momentary; and I find the subjective sensations of the patient of the utmost value in regulating the procedure. Any special means of preventing escape of gas from the anus I consider equally unnecessary, and almost equally undesirable. That opening forms a useful safety-valve; and if it were closed I believe harm would be much more likely to result when reflex contraction of the colon takes place, as it usually does promptly and vigorously.

A very brief depression of the tap is sufficient to inflate

the abdomen. When the distension is effectual in removing the obstruction, I have found that sudden, sharp pain is felt, followed by intense relief. Even where the inflation could not, so far as one can see, have done any real good (cases 7 and 8), some relief was experienced; but it was less decided than in the cases that were cured, and it did not last. In such cases it is a symptom not easy to explain.

In none of the cases of intussusception was relapse or recurrence met with. The pain in case 3, which at first suggested it, was shown by the course of the case to have quite another origin.

Now that operative results have so greatly improved, I do not know that I should be disposed to try inflation 36 or 48 hours after the onset (cases 3 and 4); but I believe that in adults the 12-hour limit fixed by Treves[1] is well within the mark, unless perhaps in unusually acute cases.

If it were desired to try this method in an infant, (and I see no reason why it should not succeed equally well if used early enough), I think the charge in the seltzogene should be reduced, say to a third of the usual amount. Even here I think chloroform would be undesirable, as it would obscure any change which might take place in the child's aspect and general condition as a result of the inflation.

My cases of intussusception are few, and fortunately—or unfortunately, according to the point of view—I have neither laparotomy nor sectio to confirm it. If the diagnosis be admitted, my results with inflation (see Table I.) compare not unfavourably with those of laparotomy: so, at least, most people will think, although those who hold that "one may fairly call it a calamity that even one case should ever have recovered by these means"[2] must, doubtless, look upon them as disastrous.

The experience recorded, and the arguments adduced above, lead me to believe that more can be said for inflation at an early stage of intussusception than most writers at the present day are disposed to admit, even as an alternative to laparotomy when a skilful operator can easily be obtained. In the interest, moreover, of the "small percentage of the cases" in the "remote districts"[3] where that is not the case, I think it would indeed be "a calamity" if inflation were entirely banished from the realm of practical therapeutics.

[1] *Loc. cit.*, p. 506. [2] *Journal, loc. cit.*, p. 147. [3] *Ibid.*, p. 141.

Clinical Record

CLINICAL NOTES OF SEVEN CASES OF ACCIDENTAL HÆMORRHAGE TREATED IN THE GLASGOW MATERNITY HOSPITAL DURING THE MONTHS OF MARCH AND APRIL

By ROBERT JARDINE, M.D., etc.

CASE I. Mrs. G., xi-para., *æt.* 37. Admitted Feb. 28th. This patient's previous labours had all been normal, but at the seventh one she had had a flooding the day before the birth of the child. She had last menstruated in July 1905. On the night of 27th February she had been wakened by pain, and discovered that her bed was stained with blood. She was admitted next day.

She was a very stout woman with thick abdominal walls, but the child could be easily palpated. The uterus was not over-distended, and there was no evidence of any clots in it. The child was alive. The internal os was closed, and no placenta could be palpated. The bleeding had ceased.

The patient was kept in bed. There was a slight show of blood nearly every day, but the amount was very trifling. On March 21st the os would admit a finger, but no placenta could be felt. On April 6th labour came on, and the child, which was alive and weighed 8¼ lb., was born naturally. The placenta came away, but it was seen to be succenturiate and a lobule had been retained. The patient was given chloroform, and the resident removed the lobule of placenta and a large amount of clot from the uterus. The patient immediately collapsed, although the loss of blood had not been very great. Strychnine and brandy were administered freely, and she rallied, but a few hours later she again became very collapsed, and almost pulseless, although there had not been any further bleeding. She was then given a saline infusion, and the strychnine was repeated. She soon rallied, and made a good recovery.

The collapse was very alarming, but it was much greater than one would expect from the amount of blood lost. I have seen several cases of great collapse after delivery where there was no great hæmorrhage, but where the hand had to be passed into the uterus to remove bits of placenta or membrane, and I believe the collapse in this case was really due to shock, and not to hæmorrhage. In such cases the patients must be very

susceptible to shock, but why they should be so it is difficult to understand.

CASE II. Mrs N., *æt.* 28, iv-para., admitted March 12th. The bleeding had begun about six hours prior to the admission. There had been no antecedent pains, and the patient had at first thought that the waters had broken. Dr Sutherland, outdoor resident, had seen her about four hours after the onset of bleeding, and had brought her into the hospital.

On admission the patient was pale and restless with a weak pulse of 120. There was some oozing from the vagina. The uterus was quite firm. The os was about one-third dilated and the cervix quite soft. Manual dilatation was quite easy, and delivery was effected by version. The child, which weighed 8¾ lb., was dead. As the uterus would not retract well it was firmly packed with iodoform gauze. Two pints of saline solution were transfused into the median basilic vein. Strychnine, $\frac{1}{30}$ gr., was given hypodermically. The pulse rapidly improved and slowed down to 70; but about four hours after delivery the patient showed indications of collapse, and the uterus was found to be very lax. It was at once firmly kneaded and ergotin given hypodermically, and strychine $\frac{1}{30}$ gr. every 3 hours, and 15$\frac{3}{3}$ of hot saline and one ounce of brandy were given per rectum. The uterus was continuously stimulated by kneading and repeated injections of ergotin. The pulse soon began to improve. The packing was removed 24 hours after its insertion, and there was no more bleeding.

The recovery was somewhat febrile, but there was no indication of sepsis. The rises of temperature were evidently due to the anæmia. The urine showed a distinct trace of albumen. An iron tonic was given.

CASE III. Mrs T., x-para., *æt.* 37, 7 months pregnant, admitted March 16th. This patient had had six living full-time children, and three miscarriages. The two pregnancies previous to the present one had ended in miscarriages.

Two days previous to admission, while the patient was at work, bleeding had come on. She had gone to bed at once, but the bleeding had continued throughout the night, but since then, up to the time of admission, there had not been much blood lost.

On admission the patient was in good condition. The os admitted a finger, and no placenta could be felt. The fœtal heart could not be heard. There was a cloud of albumen in the urine.

About 12 hours after admission bleeding came on again. Under chloroform the os was easily dilated to admit a couple

of fingers, and a foot was brought down. The aftercoming head was gripped by the cervix, and as the child was dead perforation through the mouth was done, and delivery easily effected. The placenta came away at once and was followed by some large dark clots. The uterus retracted well, and there was no post-partum hæmorrhage.

The patient made a good recovery.

CASE IV. Mrs R., v-para., *æt.* 32, admitted April 4th. This patient had had one still-born and three living children. During this pregnancy there had been swelling of the legs. The bleeding had commenced on March 26th, and continued in small quantities until the 30th, when there was a severe loss. There had been no more lost until April 3rd, the day before admission, when a large quantity had come away. There had been no pain.

On admission the patient was very anæmic looking, and complained of weakness. The radial pulse could scarcely be felt. There was slight œdema of the legs, and the urine contained a trace of albumen. The os was closed, and there were no uterine contractions. There was no bleeding.

The patient was kept perfectly quiet, and given plenty of fluid food. Three days later she had improved considerably, and her pulse was about 96. The fœtal heart could now be heard, although it could not be detected on admission. The patient was kept in bed until May 8th, when she was allowed to go home. There had been no bleeding all this time, and the anæmia had improved very much under iron and nux vomica. Before dismissal a careful examination revealed no evidence of placenta prævia. The os admitted a finger.

About a fortnight after she went home she was delivered of a premature child. There was no bleeding during the labour.

CASE V. B. B., i-para, *æt.* 24, admitted April 5th. On March 31st some labour-like pains had been felt, and bleeding had commenced, but had not continued long. On the day of admission severe bleeding had come on while the patient was at stool.

On admission the pulse was 120. The patient was having strong labour pains. The cord was prolapsed and pulseless, and the arm was down in the vagina. Under chloroform version was easily done, as the uterus had not retracted firmly round the child.

The patient was very anæmic, but made a good recovery, getting iron and nux vomica. There was a trace of albumen in her urine.

CASE VI. Mrs C., *æt.* 39, xi-para., admitted April 23rd. The bleeding had begun on April 21st and had not been excessive, but had persisted throughout the day. It had ceased until April 23rd, and had then become excessive. A doctor had seen her and had packed the vagina, but the packing had not controlled the hæmorrhage. As a matter of fact the packing had not been thoroughly done, and did more harm than good.

On admission there was marked pallor and weakness; pulse 120-130; no pain. The patient was restless. The uterus was firm and the fœtal parts could be felt, but the fœtal heart could not be heard; the os admitted two fingers. The vagina was packed firmly, two pints of saline infused under the breast, and $\frac{1}{30}$ gr. of strychnine given hypodermically and repeated three times within five hours. The foot of the bed was raised.

Next morning the pulse was 110. Labour pains began 17 hours after admission, and the packing and fœtus were expelled three hours later. There was no post-partum hæmorrhage.

The patient made a good recovery. She was given an iron tonic for the anæmia.

This case was an exceptionally favourable one for treatment by packing, as the uterus was firm and there was no risk of internal hæmorrhage occurring. When the packing was properly inserted the bleeding was completely controlled. I do not believe in the use of the plug in all cases of external accidental hæmorrhage, but in cases where the uterus is firm and not liable to become distended with blood it is a most useful method of treatment. To be of use, however, the plugging must be very thorough, and not a small amount of gauze or other material lightly pushed into the vagina.

CASE VII. Mrs M., *æt.* 31, ix-para., admitted April 25th. This patient's first child had been born alive at full time, but she stated that she had had a chill shortly after the labour, and had subsequently suffered from painful and profuse menstruation. Evidently she had suffered from sepsis. In the second pregnancy she had aborted about the third month, and her third and fourth pregnancies had ended in the birth of living children. The last five pregnancies, including the present one, had ended prematurely at from five to seven months, and had been associated with hæmorrhage. In 1903 curetting had been done in the Royal Infirmary for dysmenorrhœa and menorrhagia, with very little benefit.

In the present pregnancy, bleeding had begun about the second month, and had occurred every week or two, until three weeks before admission, and thereafter every day. She had

been trying to do her housework, but had felt very weak and subject to fainting fits.

On admission the patient was very pale, with a weak pulse of 120, and temperature of 97°. The uterus was not up to the umbilicus. Fœtal movements could be felt.

Shortly after admission pains came on, and the fœtus was expelled next morning. There was not much bleeding, but the patient was very much collapsed The placenta had several clots adhering to it, some organised and others black, and there was a good deal of black clot in the uterus. She was freely stimulated with brandy, strychnine, and hot bottles. She made a good recovery, getting a tonic of iron, arsenic, and nux vomica.

In dealing with these cases various methods of treatment were adopted, viz., expectant treatment by complete rest in bed; forcible dilatation and immediate delivery; and plugging the vagina. Shock and post-partum hæmorrhage are risks which must be guarded against. Saline infusions and repeated doses of strychnine are of the greatest use in both these conditions. If the uterus fails to retract well with the hot douche, even if there is not much bleeding, I always pack it as firmly as possible with iodoform gauze. In Case II. this was done, but in spite of it the uterus relaxed a few hours later, and could only be kept retracted by firm kneading. As soon as the hands were taken off the abdomen relaxation occurred. Firm kneading had to be kept up for some hours, otherwise, I fear, the patient's life would have been lost.

Counting the two cases of hydatid mole published in the June *Journal*, the seven cases of unavoidable hæmorrhage published in the July *Journal*, and the present seven cases of accidental hæmorrhage, we have had to deal with sixteen cases of ante-partum hæmorrhage in the space of two months—a fairly large number for a hospital of forty beds.

Births and Deaths registered in Eight of the Principal Towns of Scotland during June 1906

DURING the month of June 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4357 living children, of whom 2218 were males, and 2139 females. These births are 53 fewer than in May, and 51 fewer than in June 1905. The births are equivalent to an annual birth-rate of 29.7 per thousand of the estimated population, a rate which is 0.6 more than that

of the previous month, but 1.0 less than that of the corresponding month of last year. The birth-rate of the month ranged from 34.2 in Leith, to 23.7 in Edinburgh. In Glasgow it was 31.4; in Aberdeen, 31.0; in Dundee, 30.9; in Paisley, 29.9; in Greenock, 29.4; and in Perth, 24.0.

Of the total births, 300, or 6.9 per cent., were illegitimate. The rate of illegitimacy was for the month highest in Aberdeen, 10.3, and lowest in Paisley, 1.9. In Dundee it was 9.1; in Edinburgh, 8.3; in Greenock, 7.0; in Glasgow, 6.1; in Perth, 5.9; and in Leith, 4.3.

Deaths registered during the month numbered 2255, 1169 being of males, and 1086 of females. These deaths are equivalent to an annual death-rate of 15.4 per thousand, a rate which is 2.6 less than that of May, and 0.7 less than that of June of last year. The death-rate of the month ranged from 16.7 in Dundee, to 11.5 in Leith. In Perth it was 16.6; in Glasgow, 16.4; in Greenock, 15.3; in Edinburgh, 14.9; in Aberdeen, 12.9; and in Paisley, 12.6. In each of these towns this rate was lower than the rate of the previous month.

Of the 2255 deaths registered, 732, or 32.5 per cent., were of children of less than five years old; and 549, or 24.3 per cent., were of persons of over sixty. The former are 191 fewer than in May, and 44 fewer than in June of last year; the latter are 131 fewer than in May, but 23 more than in June of last year.

Deaths of children of less than one year old numbered 415. These are 112 fewer than in May, and 32 fewer than in June of last year, and are equivalent to an infantile mortality of 102 per thousand births, a rate which is 24 less than that of May, and 8 less than that of June of last year. The highest infantile mortality rate for the month was in Greenock, 114; and the lowest in Leith, 80. In Aberdeen it was 112; in Perth, 104; in Glasgow, 103; in Dundee, 103; in Paisley, 103; and in Edinburgh, 97. In Aberdeen, Paisley, and Perth, this rate is higher than what it was in May; in the other towns it is less than in that month.

Deaths from the principal epidemic diseases numbered 214, which is 20 fewer than in the previous month, and 25 fewer than in the corresponding month of last year. These deaths are equivalent to an annual death-rate from these causes of 1.5 per thousand, a rate which is the same as that of May, but 0.2 less than that of June of last year.

There were no deaths from small-pox. Deaths from measles numbered 59, which is 23 fewer than in May, and 25 fewer than in June of last year. Deaths from scarlet fever numbered 7, which is 5 fewer than in May, but one more than in June of last year. Deaths from whooping-cough numbered 50, which is 32

fewer than in May, and 59 fewer than in June of last year. Deaths from diphtheria numbered 23; from enteric fever, 12; and from cerebro-spinal meningitis, 28; of these last, 27 were registered in Glasgow, and 1 in Aberdeen; they are 23 more than those registered in May, and by local inquiry it has been ascertained that in 9 of them the diagnosis was verified by bacteriological examination. Deaths from diarrhœas numbered 34, and are 7 more than in May, and 14 more than in June of last year.

There were 6 deaths ascribed to influenza, which is 8 fewer than in May, and 6 fewer than in June of last year.

Deaths from puerperal septic conditions numbered 7; from malignant disease, 138, of which 76 were ascribed to carcinoma, 2 to sarcoma, and 60 to cancer not otherwise described. Deaths from heart disease numbered 223; from apoplexies, 108; from premature birth debility, 58; and from alcoholism, 8.

Deaths from pneumonia numbered 213, and constituted 9.4 per cent. of the total deaths, while those from bronchitis numbered 106, and constituted 4.7 per cent. of the total. The former are 97 fewer than in May, but 2 more than in June of last year. The latter are 93 fewer than in May, but 3 more than in June of last year.

Deaths from tuberculous diseases numbered 352, and constituted 15.6 per cent. of the total; they are 47 fewer than in May, and 2 fewer than in June of last year. Of these 352 deaths, 224 were ascribed to phthisis.

Births and Deaths registered in Eight of the Principal Towns of Scotland during July 1906

DURING the month of July 1906, there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4087 living children, of whom 2092 were males and 1995 females. These births are 270 fewer than in June, and 211 fewer than in July of last year. The equivalent annual birth-rate is 26.9 per thousand of the estimated population, being 2.8 less than that for the previous month, and 2.0 less than that for the corresponding month of 1905. The birth-rate for the month ranged from 34.5 in Greenock to 21.7 in Edinburgh. In Glasgow it was 28.7; in Leith, 27.7; in Dundee, 26.9; in Paisley, 26.8; in Aberdeen, 26.0; and in Perth, 24.2.

Of the 4087 births, 309, or 7.6 per cent., were illegitimate. The rate of illegitimacy was highest in Perth, 11.3, and lowest

in Greenock, 2.9. In Edinburgh it was 8.9; in Dundee, 8.0; in Glasgow, 7.8; in Aberdeen, 7.7; in Paisley, 7.1; and in Leith, 3.6.

The deaths of 2146 persons were registered during the month, of whom 1097 were males and 1049 females. These deaths are equivalent to an annual death-rate of 14.1 per thousand, a rate which is 1.3 less than that for June, and 0.7 less than that for July of last year. The death-rate for the month was highest in Dundee, 15.7, and lowest in Paisley, 11.5. In Glasgow the rate was 15.2; in Greenock, 13.5; in Edinburgh, 13.1; in Perth, 13.0; in Aberdeen, 12.6; and in Leith, 11.8. The rate in each of these towns, with the exception of Leith, is lower than that recorded for the previous month.

Of the 2146 deaths, 642, or 29.9 per cent., were of children under five years of age; and 550, or 25.6 per cent., were of persons aged 60 years and upwards. The former are 90 fewer than in June, and 129 fewer than in July of last year; the latter are 1 more than in June, and 34 more than in July 1905.

Deaths of infants under one year old numbered 394, which is 21 less than the number for the previous month, and 77 less than that for the corresponding month of last year. The deaths are equivalent to an infantile mortality of 94 per thousand births, a rate which is 8 less than that for June, and 18 less than that for July of last year. The highest infantile mortality-rate for the month was in Glasgow, 105; and the lowest in Greenock, 55; it was 102 in Dundee, 96 in Aberdeen, 85 in Edinburgh, 73 in Leith, 60 in Paisley, and 57 in Perth. The rate in Glasgow is slightly above that for the previous month, but is below the corresponding rate for June in all the other towns.

Deaths from the principal epidemic diseases numbered 187, and were equivalent to an annual death-rate of 1.2 per thousand of the population. The actual number of deaths is 27 less than that for June and 40 less than that for July 1905; the death-rate is 0.3 per thousand below that for June, and the same amount below that for the corresponding month of last year.

No deaths from small-pox were recorded. Deaths from measles numbered 42, which is 17 fewer than in the previous month, and 25 fewer than in July of last year. Deaths from scarlet fever numbered 6, and were 1 less than in June, but 2 more than in July 1905. Whooping-cough caused 53 deaths, which is 3 more than in the previous month, but 31 less than in the corresponding month of last year. Deaths from diphtheria numbered 17, being 6 fewer than in June, but 5 more than in July of last year. Enteric fever caused 9 deaths, fever of uncertain nature 1, and cerebro-spinal meningitis 23. The last-mentioned all occurred in Glasgow, and were 4 less than the

number registered in the same town during the previous month. Deaths from diarrhœas numbered 36, which is 2 more than the number for June, but 18 less than that for July of last year.

Influenza was the ascribed cause of 4 deaths, or 2 less than in June, and 1 less than in July 1905.

Deaths from puerperal septic infection numbered 7; from diseases of the heart, 200; from apoplexy, 129; from premature birth debility, 75; from alcoholism, 9; and from malignant disease, 170, of which 82 were ascribed to carcinoma, 5 to sarcoma, and 83 to cancer not otherwise defined.

Deaths from pneumonia numbered 149, and constituted 6.9 per cent. of the total deaths, while those from bronchitis numbered 100, and constituted 4.7 per cent. of the total. The former are 64 less than in June, and 24 less than in July 1905; the latter are 6 less than in June, but 1 more than in July of last year.

Tuberculous diseases caused 338 deaths, which is equal to 15.8 per cent. of the total mortality, and is 14 less than the number recorded from these causes in June, but 14 more than that in July 1905. Of these 338 deaths, 205 were ascribed to phthisis.

Meetings of Society

Edinburgh Obstetrical Society

THE seventh meeting of the 67th session was held on Wednesday, June 13, Vice-President Sir Halliday Croom in the chair.

Professor Kynoch exhibited the following specimens:—

1. A uterus removed for carcinoma of the body by the vaginal route.

2. A uterus with carcinoma of the body, which, on account of its size, could not be removed except by the abdominal route.

3. Uterine fibroid showing adenoma malignum.

4. Uterine fibroid showing sarcomatous degeneration.

5. Complete prolapsus uteri. The case had been of long standing and untreated. Patient was seen only when there was acute pelvic peritonitis due possibly to absorption by exposed surface. On operating, pus was found both in Fallopian tubes and in the pouch of Douglas.

6. Specimen from a case of repeated ectopic gestation. Patient was a multipara, and between the occurrence of the two ectopic pregnancies she had her sixth normal uterine pregnancy.

Dr Freeland Barbour exhibited:—

1. A uterus containing two mucous polypi removed from a

parous patient aged 54 whose menopause had been reached at 47, but in whom the polypi caused menorrhagia.

2. Four fibroid uteri removed at or after the menopause for hæmorrhage. All four were parous women. Two were from patients respectively 48 and 49 years of age; in whom menstruation had not ceased. The other two were from women past the menopause, one of whom was 64 years of age; she had ceased to menstruate 15 years previously.

Dr Lackie showed :—

1. A tubo-ovarian cyst and a parovarian tumour associated with hydrosalpinx removed from the same patient. The chief symptom these conditions gave rise to was hæmorrhage.

2. A small pyosalpinx removed from a patient who had had a puerperal perimetritis.

3. Two fibroids, one removed from a patient suffering from arthritis deformans.

Professor Kynoch then presented to the Society his communication on Post-Partum Ovariotomy. Professor Kynoch discussed the prospect of a pregnancy, associated with an ovarian tumour, going on to full time without any serious risk. After labour there were, however, greatly increased dangers, the commonest being twisting of the pedicle due to a lax abdominal wall associated with diminished intra-abdominal pressure. Again, suppuration was apt to occur, due partly to the results of pressure and partly to any septic absorption in the puerperium. Again, cysts had tendency to rupture during labour or immediately after labour.

In Professor Kynoch's first case the patient, a young woman 17 years of age, was attended by a midwife. On the 20th day after delivery, when seen, the abdomen was found distended, the pulse 136 and the temperature 104° F. Laparotomy was performed, a large multilocular ovarian removed. On examination, pus was found in the main cavity of the cyst. The patient made a good recovery.

Case 2 occurred in a multipara 24 years of age. The cyst reached to 1 inch above the umbilicus. The pulse was 130 and the temperature 103° when the patient was seen. The tumour was found to have an acutely twisted pedicle.

Case 3 was that of a woman aged 37 seen 10 days after labour, when the abdomen was found distended by a large cyst. There were no acute symptoms, pulse and temperature normal. Ovariotomy was performed at the end of the fourth week. The cyst had no adhesions.

Sir Halliday Croom and Dr Barbour discussed the paper and Professor Kynoch replied.

Sir Halliday Croom then read to the Society his communi-

cation, "In a case of heteroplastic ovarian grafting, followed by pregnancy and a living child, who is the mother?"

Several members made remarks on the communication, the opinion generally expressed being one of doubt as to the possibility of being quite certain that all ovarian tissue had been removed in the oophorectomy.

Sir Halliday Croom then read notes on a case of malignant endocarditis in pregnancy. After referring to the rarity of such cases and the fact that most cases fall into one of two types, viz. either the typhoid type or the septic type, Sir Halliday Croom proceeded to give the main facts of a case admitted to the Maternity Hospital with albuminuria and dropsy. Patient was a primipara aged 23, and was within 5 weeks of full time. The temperature suddenly rose and remained high and fluctuating. The patient was delivered of a still-born child and within 24 hours of delivery died from acute heart-failure. On post-mortem examination there was found to be septic endocarditis of the aortic and mitral valves. There was acute myocarditis. All the organs showed acute septic changes; these were marked in the kidney. The uterus showed no lacerations, its mucosa was perfectly healthy and showed no sign of sepsis.

THE eighth meeting of the 67th session was held on Wednesday, 11th July, conjointly with the Glasgow Obstetrical and Gynæcological Society. Dr J. W. Ballantyne was in the chair.

After private business, Professor Stephenson, of Aberdeen, opened a discussion on "Irregular Manifestations of Puerperal Sepsis." He said:—

For profitable discussion it is important that the subject be well defined, and the lines on which it is to run clearly indicated. To effect this is the privilege and the duty of the first speaker.

The responsibility, on the present occasion, has weighed heavily upon me, and has not been lessened by the somewhat vague title given by the Council to the subject for discussion, "The Irregular Manifestations of Puerperal Sepsis." When first I read it I felt puzzled. Taking the words as they stood, there seemed so little to discuss, and yet discussion was what was desired. Gradually I divined that—as in the system of head-lines we now are familiar with—the significance of the words lay more in what they implied than in what they expressed, and that they embodied questions that at the

present day are interesting the obstetric mind, and therefore suitable for discussion. It is from this point of view I will handle the subject. The title carries us into the wide field of sepsis and asepsis, mortality and morbidity, but at the same time places a limit to the area to be surveyed.

If I rightly understand, we are met to-day, not as scientists or specialists, but as practitioners; we are invited to consider the manifestations of puerperal sepsis, not its cause nor the mode of its propagation.

Fortunately for us the clinical field is now illumined by light from the laboratory. The brilliancy of that light at first dazzled our eyes; many shut theirs and would not look up; the minds of others were quite seared, not a few have yet to regain their balance; but the vision is clearing, so that we can discern more accurately, and give to facts their due proportion and perspective.

We owe much to the bacteriologist. By his research we have advanced far on the way of prevention, and to a slight extent in treatment. By his continuous aid our knowledge will become more accurate and effective. But the relation of micro-organisms to the manifestation of morbidity is yet far from being specifically determined. That is our work, not his. Clinical and bacteriological observation must go on hand in hand. The difficulties are numerous, and our methods of comparing results are unsatisfactory. There are many varieties of organisms; each, no doubt, has a special action, but we cannot yet clinically differentiate one from another; so far as has yet been determined, the manifestations of their presence are similar in all, and "mixed infection" is common. One form may differ from another in virulence, but so also does one and the same germ in different cases. The lesions produced are numerous; a knowledge of the site and character of the local affection is of greater prognostic value than knowing the bacterial form of the infection. The prognosis of a parametritis differs from that of an endometritis.

By the expression, "*irregular* manifestations of sepsis," it was evidently intended that we should place in the background the serious, more or less distinct, and often fatal forms of sepsis, comprehended under the old name of puerperal fever,

or the recent and more discriminate terms—septicæmia, sapræmia, and pyemia. In these the indications of infection are early, and so well pronounced that there is no room for doubt as to their nature.

There are other affections of the puerperium far from uncommon. They are less grave, shorter in duration; rarely, if ever, fatal; the septic origin of which for long was not suspected, the idea of infection having been derived from, and associated with, the graver forms only. The argument used to be heard that a given case was not due to infection, because the patient did well for a week or ten days and the temperature was never over 101°. Nowadays it is 100.4° or even 100°. Such cases give rise to anxiety, because of the early manifestation and height of the fever. In from two days to a week the temperature falls to normal, with, in many cases, a pleasing and complete recovery. In others, not unfrequently the delusive relief is dashed after a short time by the recrudescence of fever, to be prolonged almost indefinitely, and often associated with some distinct local lesion, such as a phlegmon with abscess of pelvic origin, or a phlebitic attack, or phlegmasia dolens, or mania.

Under such circumstances the connection of these affections with sepsis is direct, dating from the first week of the puerperium. We hear, however, of cases of the same nature, where it is honestly believed that, up to the acute attack, the recovery from the confinement was good, that there was no febrile condition, the temperature had been quite *normal*, which, however, many regard to be anything below 100° F. I have seen in consultation such a case of phlegmasia dolens, where the chart bore out the statement made as above regarding the absence of fever. But I was able to point out that, whilst true that the temperature had never risen above 100°, it had, during the three weeks, touched the normal line only on three or four occasions; that throughout, until the onset of the acute affection, it had run on what I call the high level, *i.e.* between 98.4° and 100°, never going lower.

It is a mistake to speak of that as the high *normal* temperature of the puerperium. It is not the *rule*.

Professor Hastings Tweedy, of Dublin, has done good service recently in drawing attention to the question I am

approaching. In his opinions I concur generally, but would change the mode of viewing the subject. The disappointing results of the enquiry made by the Committee of the British Medical Association show the futility of trying to form a uniform standard of morbidity on the lines proposed for adoption. Eight days is all too short. Some "irregular manifestations of puerperal sepsis" occur later, and would thus be unrecorded. And again, to record "all cases in which the temperature reaches 100° F. on any two of the bi-daily readings" would be to include some patients who were not suffering from sepsis. The condition of the breasts alone will occasionally supply such cases.

In forming an opinion of the well-being or illness of a lying-in woman, the whole clinical bearings must be taken into account, but for discussion it is convenient to take each separately. To save time, the statement of the opinions I have formed must be somewhat condensed, and a few points only can be touched upon. As also the graver manifestations of sepsis are not included at present, any further remarks will bear chiefly on the question of the so-called "standard of morbidity" that has come into notice.

Words are often obstacles to right thinking. "Morbidity" is one; I do not like it, and would willingly never use it; but as it has been largely adopted it must stand. Any degree of temperature determined upon cannot, by itself, be a standard of *morbidity*; it is merely a standard of febrility. A puerperal woman may suffer from sepsis, and for weeks show only subfebrile temperatures, as in the case already referred to.

If a standard is to be used for reference it should be one of well-being and security, and such we have determined for us by nature. There is abundant proof that the physiological processes going on during the puerperium do not, after the immediate effects of labour have passed off, cause any disturbance in the temperature chart of health. The terms, normal temperature and normal range, so well understood, should be the standard of well-being and security in the puerperium. For facility in reading, the mean of this normal (98.4°) is marked in most charts by a dotted line. Variations above and below this line occur regularly, but the eye readily notes that the observation data run fairly steady in what may

be called the *normal level.* This always imparts a feeling of security.

At times the data do not for days reach or but touch the line from below; they all are on a low or *sub-normal level.* This phase is generally favourable when gradually reached, but if it rapidly occur and be low, or of short duration, it is liable to be followed by a febrile rise.

Another feature in the temperature chart is where all, or the great majority, of the data are on what I would call the *high level,* barely touching the line and rarely crossing it from above at the same time. The higher or evening data are distinctly above 99° or just reach 100°—one or two may rise slightly above the 100°, showing a tendency to rise, but taking the period as a whole, the febrile state, though threatening, has not yet been developed.

So long as it lasts, this high level feature is a clear indication of insecurity. Whether or not it can be looked upon as evidence of sepsis is an important question. Knowing the almost impossibility of rendering the management of labour completely aseptic, I incline to the opinion that it is more prudent to regard it as such. It certainly should be taken as a caution or danger signal. The thermometric chart alone, however, is not a full index of sepsis—the pulse-rate must be taken along with it. The ratio between the P. and T. is the most reliable prognostic aid whenever sepsis is present, but that is a section of the subject time forbids me to open; it, moreover, is well recognised.

The method I have here sketched of appraising the clinical chart differs from that in ordinary use. It will be noted that it takes cognizance of the lower as well as the higher data in the daily observations, and the estimate formed is based not on "any two of the bi-daily readings, where the temperature reaches 100° F. within the first eight days" (B. M. Com.), but on the general character and level on which the temperature is running.

The points I have endeavoured to bring out are—

1. The condition of a patient is indicated in a clinical chart more by the horizontal than the vertical character. A high T. is not dangerous unless continued or accompanied by an undue quickening of the pulse in proportion to the T.

2. The range in the T. of the puerperium must be regarded as, or the same as, that in health, subject to like variations and irregularities, but maintaining a fairly equable level in relation to the mean normal line—a depressed T. is not unfavourable, but must be regarded with caution, as it at times precedes a febrile rise.

3. That mischief brewing can frequently be recognised before a febrile rise by the T. data lying mainly on a high level between 98.4° and 100°—rarely, if ever, crossing the line from above, at times not reaching it.

Professor Murdoch Cameron, Glasgow, gave notes on a case of long-continued high temperature in the puerperium in which he had got good results from the use of antistreptococcic serum.

Dr Freeland Barbour discussed two cases in his hospital clinique in which there had been puerperal rashes. He put forward the suggestion that such rashes might be due to the absorption by the system of some toxic substance produced by the uterus during its muscular activity in labour.

Dr Easterbrook, speaking from a large asylum experience, said that he divided cases of puerperal insanity into two classes. In the one the attack came on, as a rule, in the first week of the puerperium; the temperature was almost always high and the pulse rapid, and the cases appeared typically septic. In the second class the incidence was later, the temperature often sub-normal, and the case, as a whole, much more like one of ordinary insanity. The latter class appeared to him to be in no way of septic origin, but rather to result from the exhaustion of an unstable nervous system by pregnancy, labour, and the puerperium.

Dr Claude B. Ker said that rashes associated with puerperal septic conditions, as seen in the fever hospital, were in most cases scarlatiniform, but had this characteristic, that over joints they tended to be blotchy. As to their causation, he thought enemata, by stirring up the intestinal contents and removing the protecting mucus from the intestinal walls, might facilitate absorption and lead to an auto-intoxication which produced the rash.

Professor Dickenson, of New York, gave the history of a case he had seen in consultation. The patient had three severe hæmorrhages, the first ten days after labour, the second ten days later, and the third in the fourth week of the puerperium. The hæmorrhages were very severe, and were only controlled by uterine tamponage. Vaginal hysterectomy was performed.

On careful examination of the uterus after removal, a small focus of chronic septic mischief was found in the uterine wall, adjacent to one of the main branches of the uterine artery, into which it had evidently opened on the occasion of the three hæmorrhages.

Dr Oliphant quoted a case which he had seen in consultation. A few days after labour there was a temperature of 105° F. On swabbing out the uterine cavity he was able to obtain a pure culture of pneumococcus. The patient subsequently developed a pneumonia.

Professor Jardine said that in regard to scarlet-fever-like rashes, he found an examination of the throat of great value from the point of view of differential diagnosis. One thing which he had found had a great effect upon the production of a high temperature was the sudden involution of the uterus. This he considered was due to the sudden passage into the blood of the products of involution, which had an effect in raising the temperature.

Dr Sloan of Glasgow, Dr Macvie of Chirnside, and Dr M'Nab of Dysart also spoke.

Dr Ballantyne referred to the Brit. Med. Association Committee on Puerperal Morbidity. He also gave the history of a case in which on the fifteenth day of the puerperium there was bleeding.

Professor Stephenson, owing to the lateness of the hour, made no detailed reply.

The Fellows of the two Societies subsequently dined together in the Caledonian Station Hotel.

Editorial Notes and News

Sir Alexander R. Simpson.

THE demands on our space last month prevented us from expressing our congratulations to our new knight. But though tardy, the congratulations are no less hearty. The honour is a fitting crown to an honourable medical career, and is much appreciated by Sir Alexander's many friends, and not least by those who have been associated with him in the management of this Journal.

Prof. M'Kendrick.

ANOTHER of our editorial committee has followed Sir Alexander's example, and has stepped down from his Chair while his strength is unabated. Dr Noël Paton has been appointed by

the Crown Prof. M'Kendrick's successor. Like his predecessor, he brings to the Chair a wide knowledge of Medicine. There is, we think, a general feeling that Physiology is tending rather to become more and more a pure science. As Superintendent of the Laboratory of the Royal College of Physicians, Dr Noël Paton has for the last seventeen years been brought into close daily contact with all the departments of Medicine, and we congratulate the University of Glasgow on securing one so competent to teach the *Institutes of Medicine*, and so capable a successor to Prof. M'Kendrick.

Dr M'Kenzie Johnston.

AMONG the many changes which have occurred or are impending in the Royal Infirmary, none has caused more regret than Dr M'Kenzie Johnston's resignation. It is generally known that some time ago he suffered from an affection of the throat which required operation. The operation has been completely successful, but Dr Johnston finds that his voice is not strong enough to enable him to conduct the teaching of his department as he thinks it is due to the students it should be conducted, and he has accordingly, some of his friends think quixotically, sent in his resignation. He has, in the many responsible posts to which his colleagues have elected him, more than enough to employ the spare time which this release from teaching will supply.

The Ethics of Consultation.

IF the country which has no history is happy, so is the assemblage of medical men which never needs to discuss ethical questions. But we cannot refrain from congratulating Mr Kinsey, the Chairman of the Ethical Committee of the British Medical Association, on the admirable report on the Ethics of Consultation, and the sensible recommendations thereon, presented to the General Meeting of the Association in London. Unfortunately it was published in the supplement to the Journal, and there are, we fear, a good many members who make it almost a point of honour not to touch what they consider the unclean subject of medical politics, and have therefore probably missed this report.

We have read it and re-read it carefully, and it does not contain a single word with which we seriously disagree. Indeed it is practically the system which exists in Edinburgh reproduced in type, and in this readily available form will prove, we are sure, of immense value to the young practitioner who, unless he has been educated in Birmingham, starts his professional life in utter ignorance of such matters.

Juvenile Smoking.

Since tobacco was introduced into this country considerably over three hundred years ago, its use has continually and steadily increased. Against its use popes and kings have fulminated in vain. King James I. of England, in his *Counterblaste to Tobacco*, describes its use as "a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the black stinking fume thereof nearest resembling the horrible Stygian smoke of the pit that is bottomless." But to-day the praise of My Lady Nicotine is sung by brilliant writers, and the Imperial Tobacco Company boasts a capital of well over twelve millions sterling.

So far as men are concerned, it must appear that the Anti-Tobacco Society is fated to be numbered amongst the lost causes. It seems to be pretty generally agreed that the moderate use of tobacco by the adult is not injurious to the health, and a good deal of evidence could easily be obtained, possibly from prejudiced witnesses, in favour of the view that it is beneficial. But however this may be, there is probably complete unanimity of opinion that the use of tobacco, even in small quantities, is prejudicial to the health and physique of the young. This, at any rate, appears to be the case amongst the witnesses who have been called to give evidence before the select committee of the House of Lords at present inquiring into the subject of juvenile smoking. Mr William Todd, the Secretary of the Scottish Anti-Tobacco Society, has been able to support his evidence by the testimony of 206 Edinburgh professional medical men. Even the representatives of the tobacconists do not seem to have been able to bring forward any contrary opinion.

But in what specific ways is tobacco hurtful to young people? The Select Committee seems to have been appointed to inquire especially into the effect of juvenile smoking on physique, and evidence was led in that direction. One witness stated that physical deterioration existed to a greater extent among boys than among girls, and it was suggested that cigarette smoking might be a cause. Another witness, an ex-schoolmaster, said he could pick out the boys suffering from "tobacco heart" by the flabby character of their handwriting.

An American witness gave evidence to the effect that the cigarette was an acute issue in America, because of the cheap quality of the tobacco employed in making it, the filthy surroundings from which it was gathered and made, and also the amount of drugging it underwent. The American cigarette-maker was very ingenious in his concoctions, and cocaine and laudanum were amongst the drugs used.

That tobacco should be prejudicial to the health and physique of the young is, of course, only to be expected. Even amongst adults, indigestion and nervousness, "tobacco heart," and toxic amblyopia are by no means rare phenomena. But the evils of juvenile smoking extend much beyond the physical effects of nicotine poisoning. Cigarette smoking amongst boys is apt to be associated with a looseness of moral tone and a want of self-control, which are more serious evils than disturbance of digestion. This is an aspect of the question which was strongly emphasised a few years ago in an inquiry into the influence of the teaching of hygiene in American schools. In many of the States of America a definite amount of space in the reading-books and a definite amount of time in the school session must be devoted to lessons in hygiene, and these lessons deal largely with such subjects as temperance and tobacco smoking. The point brought out in the inquiry was that the abuse of alcohol and tobacco is a moral evil, and must be treated as such. For this purpose lessons in the physiological effects of drugs, such as many of the school text-books indulge in, are useless. Indeed a boy who won a prize in open competition for an essay on the evils of smoking was what our cousins across the water call a cigarette fiend.

It seems curious that juvenile smoking has become a problem only in quite recent years. Dr Macnamara stated that when he was a schoolmaster in 1882 there was practically no cigarette smoking among boys. Various causes may be suggested for the extraordinary increase in the habit. One of these is that tobacco dealers are laying themselves out to cater for children. A witness before the Committee exhibited a halfpenny packet of cigarettes and a farthing cigarette with a couple of matches thrown in, which he said were freely sold in Edinburgh. Cigarettes are also sold in a good many sweet-meat shops, and this doubtless favours a sale amongst juveniles.

The facts just mentioned support the view taken by most of the witnesses examined, that traders should be restricted from selling tobacco to young people under sixteen. As to whether the young people themselves should be penalised, there was more difference of opinion. It has been said that "by the law offences come," and certainly there are serious objections to making such an offence as smoking a "crime." A good many town councils in Scotland have expressed themselves in favour of trade restriction, but against constituting the purchase or use of tobacco by juveniles a legal offence. Others are in favour of a penalty against the juveniles, provided that the latter are tried at special sittings of the Courts, apart from the ordinary

prisoners who are tried at the Courts. The American witness, already referred to, stated that the general trend of opinion in the States is that not only the sellers of cigarettes to children, but the parents and the children should be punished for permitting juvenile smoking. About one-fourth of the population of America is under anti-cigarette legislation, and the general effect of the law is good. A representative of the tobacco trade suggested that sweet shops should not be licensed to sell cigarettes.

While it is no doubt possible to exaggerate the evil done by juvenile indulgence in tobacco, there is no doubt that we have here an evil which should, if possible, be put a stop to. As to the probable result of legislation prohibiting the sale of tobacco to young people under sixteen, there seems no reason to apprehend the difficulties which render more or less ineffective prohibitive legislation in the analogous case of alcohol. We are inclined to think that in this instance prohibitive legislation is likely to go a very long way towards putting an end to smoking—that is to say, to habitual smoking—among boys. As to the boys themselves, we agree with those who hold that smoking should not be made a police offence. A law against traders may not be able to accomplish everything, but what it fails to do should be left to parents and teachers. A very strong influence could also be brought to bear on offenders by boys' clubs, guilds, brigades, athletic and other associations. All organisations of this kind should have an anti-smoking clause amongst their rules. Any infringement of this regulation should be punished by a longer or shorter suspension of membership and withdrawal of the privileges of association.

School of Medicine of the Royal Colleges, Edinburgh

AT a meeting of the Governing Board of the School of Medicine of the Royal Colleges, Edinburgh, the Secretary and Registrar, Mr R. N. Ramsay, reported that the number of Students attending the School during the Winter Session 1905-6 was 1284, and during the Summer Session 1906 the number was 996.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

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THE EXTRA-SYSTOLE

WITHIN recent years there has probably been no advance in clinical medicine more striking than in our knowledge regarding irregularity of the heart's action. Quite a number of theories which were accepted with almost complete unanimity a few years ago are now proved to be erroneous, and terminology based thereon, which was recently in common vogue, is now being discarded. Modern methods of examination have disclosed the fact that irregularity of the heart's action can be analysed with such precision as to furnish a clue in many instances, either to the functional disturbance or organic lesion underlying the arhythmia, and the site of the lesion—whether in the auricles, the ventricles, or the vagus, for example—can often be diagnosed with a degree of certainty comparable to that of the topographical localisation of a cerebral lesion.

In order to understand the varieties of cardiac arhythmia, and to discriminate one form from another, it must be borne in mind that our present knowledge of the subject is fundamentally based on Gaskell's classical work on the myogenic theory of the heart's action, according to which, the contractions of that organ are not dependent on stimuli of neurogenic origin, but are automatic. It has been conclusively proved that the cardiac muscle possesses the functions of rhythmically generating stimuli to contraction, of receiving such stimuli (excitability), of contracting in response thereto (contractility), of conducting the stimulus from one muscle fibre to another (conductivity), and of maintaining a certain degree of tone (tonicity). The conduction of contraction stimuli from auricle to ventricle is rendered possible by the existence of a special system of muscle fibres, termed the auriculo-ventricular bundle, connecting the auricular muscle fibres with the ventricular.

The study of disturbance of these cardiac functions, as revealed by irregularity of the heart's action, is founded mainly on Mackenzie's exhaustive clinical study of simultaneous

tracings from the arterial pulse and from the pulsations of the jugular veins, and on the elaborate analyses of pulse tracings by Wenckebach, whose work has been in the main complementary of that of Mackenzie. The epochal researches of these two investigators have been confirmed and amplified, not only by the observations of other clinicians, but by the experimental research of Hering and his pupils in the Institute of Experimental Pathology in Prague.

It is to the most common form of irregularity, namely, that due to extra-systoles, that our attention will now be confined.

I. Nature of an Extra-Systole.

An extra-systole is a cardiac contraction which arises, not in response to a normal stimulus originating in the fibres at the mouths of the venæ cavæ, but to an abnormal stimulus which, acting directly on the muscle fibres of some other part of the heart, causes a premature beat. The long pause, which usually follows an extra-systole, was formerly regarded as evidence of an intermission, but is now termed the post-extra-systolic pause. The first normal systole after the extra-systole (the post-extra-systolic systole) causes a pulse wave of larger volume than the subsequent systoles.

II. Methods of Recognising an Extra-Systole.

(*a*) *By the subjective phenomena of which the patient may complain.*—At the moment when the extra-systole occurs, the patient may experience a sensation as of a "bump" or "thud" within the chest. This is more commonly referred to the præcordial region than to other parts. Or the long pause following an extra-systole may be perceptible to the patient, for his heart may seem for a moment to stand still; and according to Wenckebach, the patient may at the same time experience a momentary vertigo. Sometimes the patient complains of an occasional throb in the neck, this being the sensory manifestation of the large pulse wave due to the post-extra-systolic systole.

In a large number, probably a majority of cases, however, extra-systoles pass quite unnoticed by the patient.

(*b*) *By palpating the cardiac impulse and arterial pulse simultaneously.*—If we lay one hand on the præcordia, while the fingers of the other hand are laid on the radial pulse, an extra-systole can be readily appreciated. It will be found that the heart having been contracting rhythmically for a certain number of

beats, there is a double cardiac impulse coincident with the commencement of an "intermission" of the pulse. This double impulse represents a normal systole and the extra-systole which follows it. After the double impulse, of which the second beat is usually sharp and forcible, the hand which is palpating the præcordia recognises a long pause, corresponding with the "intermission" of the pulse.

(*c*) *By auscultation of the heart sounds.*—We probably find that at the start the rhythm of the first and second sounds of the heart is perfectly normal. But sooner or later we hear one of the second sounds quickly followed by other two sounds; after this there is a long pause, and thereafter the normal rhythm of the heart sounds is re-established. The transient disturbance of rhythm may be represented by the following scheme:—

— ⌣ — ⌣ — ⌣ — ⌣ — ⌣ — ⌣

If the extra-systole occur still earlier after a normal systole, the former may occasion a first but no second sound, thus—

— ⌣ — ⌣ — ⌣ — — ⌣ — ⌣

because at the moment when the extra-systole occurred the ventricles contained so little blood that their contraction was insufficient to open the semilunar valves.

In other instances when several extra-systoles rapidly succeed one another, we hear the rhythm of the cardiac sounds, previously regular, become seemingly quite irregular for a brief period; the irregularity is followed by a long pause, and this in turn by rhythmic heart sounds.

(*d*) *By digital examination of the arterial pulse.*—The starting-point of an extra-systole is usually the ventricular fibres, and the most common variety of extra-systole is consequently known as a ventricular extra-systole. In most instances it can be readily recognised by digital examination of the pulse. We count the rhythmic pulse beats, and if, while we continue to count onwards in the same rhythm, an "intermission" occur, it will be found that the first beat after the "intermission," as well as the succeeding ones, fall exactly into the rhythm, as in the following example:—

Pulse beats	|	|		|	|	|		|	|	|	|	|
Time counted	1	2	3	4	5	6	7	8	9	10	11	12

The intermission is thus exactly equal in time to two pulse periods. When this is so the interval which has been already defined as the post-extra-systolic pause is termed a "compensatory" pause. Except in very rare instances, a ventricular extra-

systole is always followed by a compensatory pause. When an extra-systole starts in the auricular fibres, however, the post-extra-systolic pause is usually shorter; it is not compensatory, and the pulse beats which follow the extra-systole do not fall into the rhythm in which we are counting.

(*e*) *By an analysis of tracings taken from the arterial pulse.*—The ventricular is the sole variety of extra-systole in which the appearances of the sphygmogram are characteristic. If a ventricular extra-systole occur very soon after a normal systole the former does not give rise to a wave in the tracing. We then find by measurement that the long interval, or "intermission," is exactly equal to the two preceding pulse periods combined.

But if the extra-systole start somewhat later it does cause a more or less well-marked wave on the descending line of the pulse tracing, and we find that the later the extra-systole the larger is the wave resulting therefrom; and further, that the wave of the extra-systole is followed by a long pause. In these cases the period which elapses between the beat preceding and that following the extra-systole is again exactly equal to the two antecedent pulse periods combined; in other words, the post-extra-systolic wave is completely compensatory.

If, for example, the normal pulse period be equal to four-fifths of a second, and an extra-systole occur two-fifths of a second after a normal systole, the length of the periods in the tracing expressed as fifths of a second are—

$$\overbrace{4\ 4}^{8}\ \overbrace{2\ 6}^{8}\ \overbrace{4\ 4}^{8}\ 4 \text{ etc.}$$

In another instance the figures may be—

$$\overbrace{3\tfrac{1}{2}\ 3\tfrac{1}{2}}^{7}\ \overbrace{1\tfrac{1}{4}\ 5\tfrac{3}{4}}^{7}\ \overbrace{3\tfrac{1}{2}\ 3\tfrac{1}{2}}^{7}\ 3\tfrac{1}{2} \text{ etc.}$$

The explanation of the compensatory pause is that the premature ventricular contraction so exhausts the conductivity of the fibres in the auriculo-ventricular bundle, that the first rhythmic stimulus after the extra-systole fails to pass from auricle to ventricle; to the next again, however, the ventricles do respond.

(*f*) *By inspection of the pulsations in the jugular vein while palpating the arterial pulse.*—At the same instant as an "intermission" in the radial pulse there is usually a well-marked impulse visible in the jugular vein. If, as is so often the case, pulsations be continuously recognisable in these veins, the jugular impulse which coincides with the "intermission" is larger than the venous

pulsations while the radial pulse is beating rhythmically. The common reason of the large impulse in the jugular vein is that when the extra-systole occurs the ventricles contract prematurely —almost at the same time as the auricles which continue to beat with unaltered rhythm—and that the right ventricle and auricle being in systole at the same instant, the blood pent up in the right auricle is forced back under increased pressure into the vena cava, and thence into the jugular vein.

(*g*) *By taking simultaneous tracings from the arterial pulse and from the pulsations in the jugular vein or from the apex-beat.*— By inspection, palpation, and auscultation, an extra-systole can be diagnosed with a fair degree of accuracy, but in order to prove that the irregularity of the pulse is really due to extra-systoles and to determine whether the extra-systole starts in the auricular fibres (auricular extra-systole), in the fibres of the auriculo-ventricular bundle (auriculo-ventricular extra-systole), or in the ventricular fibres (ventricular extra-systole), tracings must be taken. For this purpose we may use an ordinary sphygmograph, which is fitted with a time-marker, and with Mackenzie's polygraph for recording either the jugular pulsations or the apex-beat. But a more delicate apparatus, such as the Knoll-Hering kymograph, enables us to take larger and longer tracings, in which there is less risk of not recording small waves, which, small though they be, are usually of great importance for a correct interpretation of the tracings.

In a tracing taken from the jugular vein, when there is no cardiac irregularity, we find three waves in succession. One of these, the carotid wave, *c*, is found by measurement to just precede the pulse wave in the tracing from the artery. The wave preceding the carotid wave represents the rise of pressure within the vein on the occurrence of auricular systole, and is therefore termed the auricular wave, *a*. The third wave is known as the ventricular, *v*. Its interpretation is still the subject of discussion. It is regarded by some as due to ventricular systole; others suppose it to be occasioned by ventricular diastole. By suitable tracings it is possible to record the contractions of all four cardiac chambers. Even in the most grave cardiac disease the two ventricles, almost without exception, contract simultaneously, and the two auricles likewise beat synchronously.

Whenever an extra-systole occurs there is a transient disturbance either of the normal sequence or of the time of occurrence of the waves *a*, *c*, and *v* in the tracing from the jugular vein, and it is mainly by a study of such differences that we are able to diagnose extra-systoles, and to differentiate one variety from another. For practical purposes it probably matters little whether an extra-systole starts in one part of the

heart or in another, but in order to be able to distinguish the irregularity resulting from extra-systoles from irregularity due to other causes, it is necessary to know the characters of the jugular tracings in the different varieties of extra-systole.

When an extra-systole occurs we find by measurement that the wave *c* in the tracing from the jugular vein is premature, indicating that a ventricular systole has occurred too soon. The next point to determine is whether the auricles are beating rhythmically, or whether, when the extra-systole occurs, the auricular rhythm is also disturbed. We then note whether at the time of occurrence of the extra-systole the auricular wave precedes, coincides with, or follows the wave *c*. Thereafter we should measure the interval elapsing between the waves *a* and *c* of the normal systoles, and finally, if the wave *c* of the extra-systole be preceded by a wave *a*, we compare the length of the extra-systolic *a-c* interval with that of the *a-c* interval of the preceding normal beat. We are now probably able to determine whether the extra-systole has started in the auricular fibres (auricular extra-systole), in the fibres of the auriculo-ventricular bundle (auriculo-ventricular extra-systole), or in the ventricular fibres (ventricular extra-systole). The points which characterise the different varieties of extra-systole are briefly the following:—

1. *Auricular extra-systole.*—Firstly the wave *a* of the extra-systole is premature, and is followed by a wave *c*. Secondly, the *a-c* interval of the extra-systole is not only never shorter than the *a-c* interval of the preceding normal beat, but is usually much longer. The more premature the extra-systole, the longer is its *a-c* interval. Thirdly, a ventricular wave occurs after the wave *c* of the extra-systole.

The main difficulty in diagnosis is the fact that the auricular wave is also premature when an extra-systole, starting in the ventricular fibres, is transmitted backwards to the auricles (retrograde extra-systole). The points which characterise this variety of extra-systole will be referred to below.

2. *Ventricular and auriculo-ventricular extra-systoles.*—When the ventricles contract prematurely in an extra-systole, it may be found either that the rhythm of the auricular beat is maintained unaltered, or that the auricles also contract prematurely.

A. *When the auricular rhythm is disturbed at the time of the extra-systole.*—In this case, if an auricular extra-systole can be excluded, we are dealing either with an auriculo-ventricular extra-systole or with a retrograde extra-systole. For the differential diagnosis of these two varieties, a tracing from the apex-beat appears to be almost essential.

In the case of a *retrograde extra-systole*, the ventricular contraction precedes the auricular, and the interval elapsing between the contraction of the ventricle and that of the auricle is greater than the interval between the auricular and ventricular contractions of the preceding normal heart beat, in other words, the *V-a* interval of the extra-systole is greater than the *a-V* interval of the normal beat.

In the case of an *auriculo-ventricular extra-systole* with disturbance of the auricular rhythm, the auricular beat may coincide with, precede, or follow the ventricular contraction. If the interval between the ventricular contraction and that of the auricle—the *V-a* interval—be shorter than the *a-V* interval of the normal heart, we are dealing with an extra-systole which starts in the auriculo-ventricular bundle (*i.e.* an auriculo-ventricular extra-systole), and causes the ventricle to contract before the auricle. An auriculo-ventricular extra-systole may, however, cause the auricle to contract before the ventricle, but here again the *a-V* interval is shorter than the *a-V* interval of the preceding normal heart beat.

B. *When the rhythm of the auricles is maintained unaltered.*—Mackenzie suggests that the real starting-point of the commonest variety of extra-systole, namely that called the "ventricular" extra-systole, is not, as was formerly supposed, the fibres of the ventricles, but those of the auriculo-ventricular bundle, and Hering admits that when the auricles maintain an unaltered rhythm we cannot distinguish an extra-systole starting in the auriculo-ventricular bundle from one starting in the ventricle. In these cases we find that the post-extra-systolic pause in the tracing from the arterial pulse is, as already stated, completely compensatory, that the auricular rhythm remains unaltered throughout the tracing, and that no ventricular wave is produced by the extra-systole. The reason for its absence from the jugular tracing has been satisfactorily explained by Mackenzie.

Whether the so-called ventricular extra-systole start in the ventricle or the auriculo-ventricular bundle, we cannot say, but that an extra-systole of true ventricular origin may occur is proved by the occasional advent of an *interpolated extra-systole*, namely, a contraction of the ventricles, which occurs so soon after a normal systole that they are able to contract in response to the next normal stimulus coming from the auricles. An interpolated extra-systole therefore causes no irregularity of the pulse.

III. Differential Diagnosis of Irregularity due to Extra-Systoles from Irregularity due to Other Causes.

The three forms of irregularity most likely to be mistaken for irregularity of extra-systolic nature are respiratory irregularity of the pulse, the alternating pulse, and irregularity due to depression of the conductivity of the heart muscle.

1. *Respiratory irregularity of the pulse* is characterised by the pulse-rate being markedly accelerated during inspiration, and retarded during expiration. There is no disturbance of the auriculo-ventricular rhythm. According to Hering, who opened the discussion on arhythmia at the recent German Congress for Internal Medicine, this form of irregularity is of pathological significance only when it occurs during tranquil respiration, or when the irregularity persists in spite of voluntary cessation of respiration. It is often well seen in young persons, even in those in good health, and it is frequently observed during convalescence from acute infective diseases, in neurasthenia, and in cerebral affections attended with irritation of the vagus centre. This form of irregularity may be seen in cases of organic heart disease, but is not a sign of cardiac enfeeblement, and is merely evidence of augmented action of the inhibitory fibres of the vagus.

2. *The alternating pulse.*—In this form of irregularity every alternate beat of the pulse is of smaller volume than that of the beat preceding and that following it. The alternating pulse might, therefore, be mistaken for the irregularity due to an extra-systole after each normal beat of the heart. The distinction lies in the recognition of the fact that in the alternating pulse, which is due to defective contractility of the heart muscle, the pulse waves occur at regular or almost regular intervals; there is no evidence of a premature beat and a compensatory pause, and the irregularity is more permanent than the irregularity due to extra-systoles.

3. *Irregularity due to depression of conductivity of the heart muscle.*—This form of irregularity can be excluded by measuring the *a-c* interval in the jugular tracing. This interval is a fairly accurate index of the time elapsing between the auricular contraction and the ventricular, and therefore of the conductivity of the auriculo-ventricular bundle. The normal *a-c* interval does not exceed one-fifth of a second, but, when conductivity is depressed, may be considerably longer, and every now and again the conductivity may be so impaired that a stimulus is not transmitted onwards to the ventricles. A ventricular systole is therefore dropped, and the pulse thus becomes irregular, with an occasional long pause.

IV. Etiology and Clinical Significance of Extra-Systoles.

It is generally admitted that an extra-systole never occurs except by a stimulus applied directly to the cardiac muscle fibres. That extra-systoles are seen in the most diverse clinical conditions, however, is well known. Wenckebach classifies the cases into four groups:—

1. Persons in whom there is no recognisable organic disease of the heart, no evidence of cardiac enfeeblement, and no signs of disease elsewhere. Some individuals in fact have throughout life an occasional extra-systole, and yet attain a ripe old age. In such cases the extra-systoles are almost devoid of clinical significance, and it is assumed that they are the expression either of a congenital or an acquired hyperexcitability of the cardiac muscle. In this group are also included those cases where there is an "irritable weakness" of the heart, as in neurasthenic individuals, in whom extra-systoles are not infrequent.

2. The second group comprises those patients in whom, although there is no organic disease of the heart, extra-systoles are an indirect result of disease in some other organ, *e.g.* gastro-intestinal disorders. Extra-systoles, however, are never due to a direct reflex action. A stimulus of nervous origin may, indeed, as Hering puts it, induce an extra-systole, but only indirectly, by stimulating vaso-constrictor fibres and thus increasing the resistance offered to the outflow of blood from the left ventricle. The proximate cause of the "reflex extra-systole" is therefore a mechanical one. Toxic substances of various kinds are a common cause of extra-systoles. Tea and tobacco often excite this form of irregularity, and the same holds good for many of the acute infective diseases, notably acute lobar pneumonia. If extra-systoles occur during the first few days of this disease, they point to the heart being seriously damaged, and indicate a grave prognosis. On the other hand, extra-systoles which appear for the first time during convalescence from pneumonia need not be regarded as danger signals.

3. The third group includes cases where there is some disorder of the circulatory system, although there is no serious disease of the heart itself. High arterial blood pressure and arterio-sclerosis are two of the most potent causes of extra-systoles, and it is mainly on these grounds that the senile heart is so frequently attended with irregularity.

4. Extra-systoles occurring in cases of organic heart disease constitute the fourth group. Valvular disease, inflammatory

and degenerative changes of the heart wall, dilatation of its cavities, imperfect blood supply, and other pathological conditions may lead to the occurrence of extra-systoles, but they do not, of course, arise in all such cases.

REFERENCES.

D. Gerhardt. *Deutsches Arch. f. klin. Med.*, Bd. lxxxii., 1905, p. 509.

H. E. Hering. *Zeitschr. f. exper. Path. u. Therapie*, Bd. i., 1905, p. 26.

H. E. Hering and J. Rihl. *Zeitschr. f. exper. Path. u. Therapie*, Bd. ii., 1906, p. 511.

J. Mackenzie. "The Study of the Pulse," 1902; *Brit. Med. Journ.*, 1904, i. p. 529; *Ibid.*, 1905, i. pp. 759, 812.

J. Mackenzie and K. F. Wenckebach. *Arch. f. Anat. u. Physiol.*, Physiol. Abth., 1905, p. 235.

O. Pan. *Deutsches Arch. f. klin. Med.*, Bd. lxxviii., 1903, p. 128; *Zeitschr. f. exper. Path. u. Therapie*, Bd. i., 1905, p. 58.

J. Rihl. *Zeitschr. f. exper. Path. u. Therapie*, Bd. i., 1905, p. 43.

K. F. Wenckebach. "Arhythmia of the Heart, a Physiological and Clinical Study" (translated by T. Snowball), 1904; *Arch. f. Anat. u. Physiol.*, Physiol. Abth. 1906, p. 297.

GYNÆCOLOGY

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URINARY FISTULÆ

FEW gynæcologists, however limited their experience, will question the statement that the repair of urinary fistulæ is one of the most troublesome operations which it falls to the lot of the gynæcologist to undertake. Those whose personal experience does not force them to concur in this statement will find strong evidence in favour of their accepting its validity in the number of contributions to gynæcological literature which have for their object the making known of new, or slightly modified, methods of dealing with the condition—a condition so easy to diagnose, yet so hard to treat. In many other operations the surgeon may fail to achieve the object he set himself, yet his incomplete success may give the patient relief and satisfaction. Far otherwise, in the treatment of urinary fistulæ, where any result short of complete success is, from the patient's point of view, equivalent to utter failure.

Two interesting articles on fistulæ appear in almost consecutive numbers of the *Revue de Gynécologie*. One by Émile Forgue (1), in addition to the record of the treatment of a case,

contains an able and moderate survey of the relative value of the various supra-pubic methods of operating. M. Forgue begins by stating the difficulties met with in using the vaginal route, laying special stress on the narrowness of the vagina, the thickening and induration of its walls, whose adhesions often prevent their being drawn down. Further, the speculum, in spite of previous dilatation, often does not give a clear view of the field of operation. A difficult complication often arises from the contraction of the bladder and its induration by peri-cystic cicatrisation. Again, in deep vesico-cervical fistulæ, the anterior lip of the cervix is always more or less destroyed, and its irregular stump offers but a poor point on which to make traction in pulling down the uterus, even supposing that organ is not fixed to the pelvic walls by adhesions. Such a state of matters quite prevents the operator obtaining the two conditions so necessary to the satisfactory carrying out of a plastic operation, viz. descent of the uterus and a complete view of the field of operation. In such cases one has to operate at the apex of the vagina, using the sense of touch rather than that of sight, with the result that the freshening of the edges of the fistula is carried out with difficulty, and, despite many patent needles, the suturing lacks precision, alike in the passage of the stitches and in their tying. M. Forgue in passing pays tribute to Jobert (2), the principle of whose "Autoplastie vésicale par glissement" Pozzi considered worthy of being termed "epoch-making." But, M. Forgue states, while the separation of the septum is in most cases of vaginal-hysterectomy easily carried out to the desired extent, in cases of fistulæ, on the other hand, it must be borne in mind that the relations of the bladder to the uterus and vagina have undergone very material changes. To begin with, the more or less complete destruction of the anterior lip of the cervix renders the incision in the anterior fornix less precise. Instead of loose, easily broken down tissue, between the bladder and the supra-vaginal portion of the cervix, the finger strikes dense adhesions, which are the more difficult to break down because of the cervix remaining high up and fixed.

But, above all, it is extensive destructive lesions of the anterior lip of the cervix which oppose the most serious obstacles to the repair, per vaginam, of deep cervical fistulæ. In such cases some operators have sutured the posterior lip of the cervix to the vaginal margin of the fistula, thus performing "hystéro-cléisis-vésical." As a result of this procedure the cervix uteri is incarcerated in the bladder, consequently the menstrual flow passes by the bladder, while the urine can flow into, and remain stagnant within, the uterine cavity. Accurate clinical

records are still wanting to show how long patients, with such an abnormal communication between uterus and bladder, can remain free from cystitis, ascending uretero-nephritis, metritis, salpingitis, and the other complications which one would logically expect, and which are rendered all the more probable by the frequent pre-existence of bladder infection.

In cases of fistulæ situated high up, which are difficult of access from below, the gynæcologist naturally directs his attention to the supra-pubic line of approach. The supra-pubic operations for the repair of fistulæ fall into three classes:—

1. The "Trans-vesical" operation: here the fistula is reached by a hypogastric incision and opening the bladder.

2. The "Sub-peritoneal" operation, in which the fistula is reached by stripping the peritoneum off the bladder back to the retro-vesical fold.

3. The "Trans-Peritoneal" operation: here the abdomen is opened as for an ordinary laparotomy. The utero-vesical fold of peritoneum incised transversely, and the bladder separated from the uterus and vagina as far as necessary in order to reach the fistula.

Though Dittel employed this technique in 1893, there seem to be practically no published records of cases till this case by M. Forgue. The patient, 43 years of age, had been delivered of her tenth child five months previously. Labour was difficult, and was terminated by using forceps. From the day immediately following the confinement, patient noticed that all her urine was passed per vaginam.

On admission to hospital there was complete incontinence of urine. On examination the vagina was found narrowed by cicatricial contractions; at the apex of the vagina there was a deep cervical fistula, situated very high and complicated by entire destruction of the anterior lip of the cervix, while the posterior lip was only recognisable as an irregular projection. All attempts to pull down the uterus were fruitless, and it was impossible to attempt to render the fistula more accessible for the purpose of freshening its edges or putting in sutures in a satisfactory way. Foreseeing great obstacles to a trans-vesical intervention, on account of the patient suffering from a chronic cystitis, as well as from the smallness of the bladder, M. Forgue decided to use the trans-peritoneal route. The abdomen having been opened in the usual manner, the fundus uteri was grasped and forcibly lifted up. The vesico-uterine cul-de-sac of peritoneum was then opened by a transverse incision, which was so free that it encroached on the broad ligaments. In consequence of the drawing up of the uterus, it was possible with precision to free the fundus of the bladder from the fibrous adhesions which

bound it to the anterior wall of the isthmus. This dissection had to be carried out with great care, using the finger as much as possible rather than any cutting instrument. Gradually, while the uterus was drawn upwards and backwards, the bladder was pulled downwards and forwards. In this way the cervix was approached and the fistula exposed. To avoid any soiling of the peritoneum with urine, a risk increased by the fact that the patient was in the Trendelenburg position, the pelvis was shut off with gauze packing. The separation of the bladder from the uterus and vagina was now carried beyond the fistula without one drop of urine touching the peritoneal cavity. M. Forgue lays great stress on the ease with which, by shutting off with gauze swabs, one may avoid the danger of peritoneal infection by the urine, a danger which is strongly urged by some as a reason for not using this route for operating. Having separated the bladder from the uterus and vagina sufficiently to fully expose the fistulous openings in each plane, M. Forgue was able freely to freshen and trim the edges of the fistula, excising such cicatricial tissue as interfered with the accurate and complete apposition of the edges. There now remained the closing of the fistulous openings in the now separated vesico-utero-vaginal septum, *i.e.* in the vesical plane in front and the utero-vaginal plane behind.

It is at this stage, M. Forgue maintains, that one reaps the greatest advantage, since free separation of the septum allows perfect stitching of the fistulous openings in both planes. Two layers of sutures were employed; the first, a simple catgut suture, united the edges of both fistulous openings longitudinally; a row of Lembert sutures was then passed in such a way as to completely bury this first suture. In this way a complete and anatomical repair was, M. Forgue holds, established. The cut edges of the vesico-uterine fold of peritoneum were then brought together with fine catgut stitches. The abdominal wound was closed in three layers, a small drain being left at the lower angle. M. Forgue enters into full details of the post-operative history of the case. In brief, the facts are as follows: For four days progress was excellent, temperature normal, and all the urine passing by the fixed-catheter. On the fifth day the pre-existing cystitis rendered the bladder intolerant of the catheter. For three days good progress was made, the catheter being passed three-hourly. On the eighth day, however, some urine escaped by the partly re-opened fistula. On leaving hospital thirty-one days after operation, the urine, in spite of washing out of the bladder, remained septic, and the fistula allowed an escape of urine which varied in amount. Eight months after operation the

his operation of episiorraphie and the formation of a hypogastric meatus.

Chénieux divides his operation into two stages, the formation of the hypogastric meatus and the episiorraphie. In regard to the first step he says little. The episiorraphie he describes as follows: Make two lateral vulvar flaps, one of which is dissected up from without, inwards towards the vulvar orifice, which it half surrounds. This flap is turned on its attached border—*i.e.* its border nearest the vulvar orifice—as on a hinge, so that its skin surface faces the vaginal canal, while its raw surface is exposed and looks outwards. The second flap, which surrounds the remaining half of the vulvar orifice, is dissected up from within outwards, so that its attached margin is the one remote from the vulvar orifice. The first flap is now stitched to the raw surface made by raising the second flap. The second or superficial flap is then drawn across in front of the deep or first flap, and its edges stitched to the margins of the raw surface left by the dissecting up of the first flap. The two flaps are thus in apposition, their raw surfaces being in contact By this means the closure of the vulva is not only complete but, further, is effected by a solid double fold of tissue which on each aspect, presents a smooth skin-covered surface. While this operation is open to the objections urged against all procedures which leave the unnatural communication between the uterus, vagina, and bladder, operations which have been tersely stigmatised as the baffled plastic surgeon's last resort, yet it complies with the requirements of Chénieux's maxim in so far as it arrests the constant flow of urine with the consequent misery, and is thus, in cases where all other means have failed, at least worthy of consideration.

REFERENCES.

1. Émile Forgue. "De l'Opération Transpéritonéale dans le Traitment des Fistules Vesico-Utéro-Vaginales," *Rev. de Gyn.*, Tome x. 3.

2. Jobert. *Bull. de l'Acad. de Méd.*, vol. xii. p. 492.

3. M. Chénieux. "Du Méat Hypogastrique et de l'Épisiorraphie, etc.," *Rev. de Gyn.*, Tome x. 1.

ERRATUM.

In Dr Marnoch's paper in the August issue, p. 176, Case I., line 3, for 1902 read 1892.

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PRIMARY SARCOMATA OF THE STOMACH

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(This paper is also published in the *Australasian Medical Gazette* for July 1906)

THE rarity of primary sarcomata of the stomach, the occurrence of two instances within a few months in the surgical practice of one of us (Dr M'Cormick) who had not previously encountered a similar condition, and the successful removal of both growths, appear to us to justify this communication.

CASE I. The first case was that of a woman, 53 years of age, who complained of a tumour of the abdomen, which was first noticed about two years before, and had lately increased. It caused at times a sense of uneasiness, but no pain. The appetite and general health were always good, and there were no symptoms referable to the stomach. Retention of urine for about 18 hours was experienced on three different occasions.

The patient was thin, but not cachectic. There could be felt a rounded, nodular tumour, about the size of a cricket ball, fairly firm and somewhat elastic, freely movable about the upper abdomen, and easily lost in the left hypochondrium. It

was thought to be a hydatid of the extreme edge of the left lobe of the liver, or a movable cystic kidney.

On 16th February 1906 the abdomen was opened, but no direct view could be obtained of the tumour, which had retreated into the left renal region. Further exploration revealed the tumour lying free in the lesser peritoneal sac, with the exception of an attachment at its upper end to the posterior wall of the stomach. The growth was excised, together with the portion of stomach wall to which it was attached, and the opening in the viscus was closed. Convalescence was uneventful. The patient was discharged from hospital 23 days from the date of operation, and has remained well for a period of 5 months.

From the excised area of the posterior wall of the stomach the main mass of the growth projected externally in the form of a pedunculated tumour, measuring about 5 inches in its long axis at right angles to the surface of the stomach, and about $3\frac{1}{4}$ by $2\frac{1}{2}$ inches in its other dimensions. It was attached to the stomach by a relatively constricted rounded pedicle of about $1\frac{3}{4}$ inches diameter, which was continuous with an expanded basal portion infiltrating the submucosa throughout an area 3 by 2 inches in extent. The tumour, together with the small portion of stomach excised, weighed 13 ounces.

The body of the growth external to the stomach was everywhere invested by a smooth, glistening capsule, which appeared to be continuous over the pedicle with the peritoneal covering of the stomach, so that, apart from its continuity through the pedicle with the gastric submucosa, there was no trace of adhesion to other structures. In parts the investing capsule was thick, opaque, and whitish or yellowish in colour; in parts it was stretched and thinned to translucency by underlying foci of more rapid growth, which projected from the surface as nodular elevations from $\frac{1}{4}$ to 1 inch in diameter, and had a reddish, livid, or almost black hue. On section the growth presented in the half next the pedicle an almost uniform whitish colour and firm consistence; in the half remote from the pedicle, areas of softening, necrosis, and hæmorrhage were apparent, the tissue was softer, more translucent, and gelatinous; while the marginal zone was formed of a plexus of dilated blood channels.

The portion of the growth within the stomach wall also showed a uniform whitish colour and firm consistence. It could be located definitely in the submucosa, and the separation of the mucous from the muscular layers definitely traced. Remains of the muscular coat were reflected outwards to form part of the investment of the pedicle, while the mucosa was projected by the subjacent growth into the interior of the stomach, where it formed a prominence about 1 inch in height and of a roughly elliptical outline. Corresponding to one focus of this ellipse, and corresponding also to the centre of the pedicle, there was a deep umbilicated depression, about ¾ inch deep and ¾ inch in diameter, in the floor of which the mucosa was eroded and bleeding. The remainder of the mucous membrane was intact.

The infiltration of the new growth was indicative of a low order of malignancy. Throughout its entire perimeter the infiltrating margin did not merge insensibly into the submucosa, but ceased abruptly with a sharply-defined edge. Moreover, as the growth advanced, it did not noticeably infiltrate either the mucous membrane or the muscular coat, but confined itself to the submucosa, simply dissecting the mucous from the muscular layers.

The limited malignancy of the new growth was emphasised by the microscopic examination of its structure and of its relation to adjacent tissues. It was a spindle-cell sarcoma, showing in places a tendency to fibrous transformation, and in the pedunculated portion, remote from the pedicle, considerable myxomatous degeneration.

CASE II. The second case was that of a man, 62 years old, who complained of a large abdominal swelling with little or no pain, and no symptoms referable to the stomach or bowels. He was a spare man, but otherwise healthy, and said he had not lost weight, though he was growing weaker. On examination, a rounded nodular mass of a tense elastic feel could be detected in the abdomen below the umbilicus; it was freely movable. Two months later the mass had greatly increased in size and was more fixed. It was thought to be a malignant growth, but its origin could not be determined.

On 13th May 1906, an exploratory incision was made in

the middle line, and the tumour presented in the wound. It had an extensive attachment to the stomach, from the posterior surface of which it took origin. The transverse colon was stretched round its lower margin with the great omentum in front. The tumour, in fact, filled the lesser sac of peritoneum and was adherent to the transverse mesocolon below and to the great omentum in front. No sign of secondary growth was detected.

The transverse mesocolon was divided close to the posterior abdominal wall, and, on raising the tumour, the lesser peritoneal sac was exposed. The colon was isolated and divided below the hepatic and splenic flexures respectively, and the divided ends united by a Murphy's button. The great omentum was then ligatured off right and left, and the tumour was held only by its attachment to the stomach. The pyloric end of the stomach beyond the growth was next divided, and the distal extremity closed with two tiers of sutures. The cardiac end was similarly dealt with, and the proximal extremity having been closed with three tiers of sutures, the lesser omentum was ligatured in pieces from right to left and divided. The tumour was then free, with about two-thirds of the stomach and a considerable length of colon adherent to it.

The next step was a gastro-enterostomy between the remains of the cardiac end of the stomach and the commencement of the jejunum, which passed down behind the large intestine in the gap left by the excised transverse mesocolon. The Murphy's button uniting the divided colon was reinforced by a sero-muscular tier of sutures, and the ascending colon freed to allow the button to lie to the left of the spinal column. The abdomen was then closed.

The patient made a rapid recovery. On the morning of the second day (forty-eight hours after operation), castor oil was administered with much benefit. Albumen water was given from the first along with nutrient enemata. A cup of tea was taken on the second day, and thereafter he was allowed semi-solid food. The button was passed towards the end of the third week, and the patient left hospital twenty-four days after the operation. For a week before he left he was able to take tender roast beef and boiled chicken. Two months have now elapsed since the operation and he still continues well.

Together with the growth there were removed a portion of stomach measuring 9 inches along its greater curvature, more than 12 inches of the transverse colon, and the great omentum. The weight of the whole mass was 4 lb. This growth also started from the posterior wall of the stomach and the main mass was external to the viscus. It measured 6 inches in a direction perpendicular to the stomach surface, 7 inches transversely, and 4 inches from before backwards. The local infiltration of the stomach wall was less extensive; it occupied an area 4 by 3 inches in extent, and formed nodular projections into the interior about 1 inch deep, separating the mucous from the muscular layers by that distance. There was no ulceration.

The anterior surface of the growth was overlapped by stomach for a distance of 2 inches from above downwards. Beneath and behind the rounded lower margin of the growth, the transverse colon was bound down by chronic inflammatory adhesions. The intervening great omentum was stretched and adherent to the growth. No enlarged glands were observed, and the colon and omentum, although adherent to the new growth, were not infiltrated by it.

On section the tumour showed peripheral foci of recent new growth, white, opaque, firm; throughout a deeper zone, areas of necrosis, softening, and hæmorrhage were abundant; while the centre of the mass was occupied by semi-fluid detritus, mixed with altered blood. As in the case already described, the new growth could be definitely located in the submucosa, in which it grew and spread, separating the mucous from the muscular layers.

Microscopic examination revealed the structure of a large spindle-cell sarcoma. Sections were prepared from four different parts, and in three of them the new growth was typically sarcomatous and apparently of somewhat rapid growth. In the fourth the cells were arranged in more compact bundles, the nuclei were more elongated and regular, and the general character of the tissue suggested non-striped muscle. No continuity with the muscular coat of the stomach could, however, be traced.

CASE III. We are enabled to include a short account of this case through the courtesy of Dr Camac Wilkinson, who

made the examination in October 1899, while he was Honorary Pathologist to the Royal Prince Alfred Hospital. The patient was a man aged 40 years. The symptoms were entirely pulmonary, eventuating in gangrene, and were present only six months. Ulceration had taken place from the interior of the stomach right through the growth, with the result that a large abscess was formed, bounded by the left dome of the diaphragm, the extreme left border of the liver, the upper end of the left kidney, and the stomach. The gangrenous spleen was imbedded in the pus. One small nodule was found on the surface of the liver, but none elsewhere.

The growth was situate on the posterior wall and greater curvature, near to, but not involving, the cardiac orifice. Externally the growth projected as a flattened, rounded mass, about 4 inches in diameter, extending about 2 inches beyond the outer surface of the stomach. In the interior the growth formed an indurated base over a rounded area about 3 inches in diameter, from which there projected large fungating masses, abruptly raised above the mucous surface to a height of 2 inches and less. The superficial extent of the growth was thus less on the internal than on the external surface; nevertheless, the origin could be definitely traced to the submucous tissue, the muscular layer being separated off and reflected on to the outer surface of the growth. Under the microscope the structure appeared very uniform, and was a typical example of a small spindle-cell sarcoma.

Literature.—We have consulted as many original records as the limited facilities at our disposal would permit, and we have tabulated the results in the summary given below. To this summary we have added several accounts taken at second hand when sufficient detail was given for the purposes of our table, and we have indicated the authority from whom we derived the information. A list of original references is given at the end of the paper. These are entirely of British and of German origin. A considerable proportion of the cases is recorded in American periodicals, to which, unfortunately, we have been unable to obtain access. We are indebted to reviews and discussions of published cases, given by Tilger, by Fenwick, by Mayo Robson and Moynihan, and by Corner and Fairbank—the most complete list of references

being given by the last-named authors, who criticise the literature of the primary sarcomata of the entire alimentary tract from œsophagus to rectum.

Frequency.—It is as yet impossible to estimate with any approach to accuracy the relative positions of sarcoma and of cancer among the primary malignant new growths of the stomach. The oft-quoted statistics of Perry and Shaw, who found 4 cases of sarcoma among 50 malignant tumours of the stomach have reference only to museum specimens, which, being presumably selected to illustrate special points of interest, cannot be regarded as equivalent to a series of consecutive cases. Fenwick records the occurrence of 2 sarcomata out of 23 consecutive cases of primary malignant disease, but the number of cases examined is too small to justify the inference that sarcomata form even approximately 8 per cent. of primary malignant gastric neoplasms.

Nor do we incline to the opinion that a more careful examination of such new growths would reveal more than a very occasional sarcoma. Yet that occasional sarcoma in a consecutive series submitted to careful microscopic examination would be of greater value than the isolated records which alone we, along with most other observers, can offer.

Still less are we disposed to consider that among the new growths classed as cancers, after microscopic examination, there are likely to be included many sarcomata. On the contrary, it is more probable that the opposite error prevails. Parts of diffuse carcinomatous growths in our experience not infrequently bear a close resemblance to sarcomatous tissue, and in some instances only the investigation of sections from different areas reveals the cancerous nature of the growth. Witness the case described by Christy Wilson as a primary sarcoma of the stomach and later determined to be cancerous.

The number of cases on record, as was to be expected from the wider diffusion of pathological interest, has increased rapidly within recent years. Whereas in 1864 Virchow noted 3 cases, exclusive of myo-sarcomata,[1] in 1893 Tilger makes reference to less than 20, in 1897 Schlesinger (quoted by Mayo Robson and Moynihan) collected 30 cases, while in 1901

[1] We were unable to consult Virchow's references to myo-sarcomata owing to a volume of his monograph on tumours being missing.

Fenwick accepts at least 53 cases, and in 1905 Corner and Fairbank admit as genuine at least 58 cases. So far as we can judge from our incomplete review of the literature of the subject, it is improbable that the total number of properly authenticated instances of primary gastric sarcoma exceeds 60.

Sex.—The sexes appear to be equally liable. Corner and Fairbank found that 26 were described as occurring in men and 29 in women.

Age.—The same observers found that there were more cases of primary gastric sarcoma recorded in persons over 70 than under 10 years of age; that there were just as many between 50 and 70 as between 10 and 30 years of age; that only 10 of the cases occurred in persons under 20 years of age, while more than 40 occurred after the 20th year; and that the maximum incidence fell between the 40th and the 50th year. A reference to our tabulated list emphasises the fact that sarcoma is more frequent in the later than in the earlier years of life—an observation recorded in the Scientific Reports of the Imperial Cancer Research Fund with reference to sarcomata in general. The perfunctory classification of malignant growths as sarcomata when they arise in the young, and as cancers when they arise in those of riper years, is a convention much to be deprecated.

Varieties and Sites.—Many different varieties have been described, including round (21), spindle (7), and mixed (4) cell forms, lympho- (8), myo- (6), fibro- (2), myxo- (1), angio- (1) sarcoma, and alveolar sarcoma (2). The data are those of Corner and Fairbank. We consider that much importance should not be attached to refinements of subdivision, since different observers might very fairly classify the same sarcoma under a variety of headings. For all practical purposes primary sarcomata of the stomach may be divided into two groups: (1) the round-cell forms, including lympho-sarcomata; and (2) the spindle-cell forms, including fibro- and myo-sarcomata. Moreover, it would appear—and the suggestion is borne out by our tables—that each of these two main groups has its own characteristic distribution in the stomach and its own symptomatology.

1. Sarcomata of the round-cell group frequently start in the pyloric half of the stomach, and generally manifest them-

selves as diffuse infiltrations of the stomach wall. There is usually no stenosis of the pylorus—the orifice being kept open by the rigidity of the walls—but the cardiac end is often dilated. The infiltration gradually shades off into the unaffected portions of the viscus, and extends some distance beyond the obvious limits of the disease. In the affected area the bulk of the growth is encountered in the submucous tissue, from which it may extend to infiltrate all the other coats. The mucous membrane is projected inwards, and at first only stretched over the growth; later it may undergo ulceration. In relatively few cases does this form of growth give rise to a globular tumour projecting from the stomach wall. The general symptoms are very like those of carcinoma in the same region, and the chemism of the stomach is modified in the same way. A tumour may or may not be detected. The disease is fairly rapid in its course, and there is a tendency to early glandular infection.

2. Sarcomata of the spindle-cell group generally spring from the body of the stomach near the greater curvature and often from its posterior wall. They commonly take the form of localised growths which sooner or later project from the outer surface of the stomach; and when, as so often happens, they grow from the posterior wall, they pass into the lesser sac of peritoneum which they may come to distend. As they increase in size, they frequently become pedunculated, and may form adhesions with adjacent structures. The spindle-cell forms and fibro-sarcomata take origin from the submucosa, though they have been described as arising in the subserosa (Miodowski). The myo-sarcomata have been traced to the muscular coat. All forms display a relatively limited malignancy, though secondary growths have been recorded, particularly in the liver. All symptoms referable to the stomach are at the commencement of the disease characteristically absent. Even in the later stages all that can be recognised may be the presence of a firm rounded tumour, freely movable and readily lost in the left hypochondrium. The attachment to the stomach is usually unsuspected, and revealed only at the operation or autopsy.

Removal and Recurrence.—Corner and Fairbank note that excision has been performed in 15 instances, of which 12

recovered from the operation. Our analysis of recorded cases, so far as it goes, would indicate that the majority of successful operations have been accomplished in relation to growths of the spindle-cell group. Thus Hartley records the recovery of a patient after removal of a spindle-cell sarcoma very similar to our first case, and Cantwell successfully removed a growth much larger than our second specimen, but otherwise not dissimilar. In Cantwell's case, recurrence after 8 months was noted. Through the courtesy of Dr Bird of Melbourne we learn that the sarcoma successfully removed by him in 1903 was also of the spindle-cell group, that the patient lived 3 years and 4 months after the operation, dying of a large recurrence in the epigastrium, and that until about 5 months before death his health was excellent and he was able to do heavy farm work. Data relating to recurrence are unfortunately meagre. Corner and Fairbank state that 4 cases are reported alive and well 4, 5, 12, and 24 months after operation. More information in this regard would be of value, and would probably show that most of the patients from whom the sarcoma was removed did not die of recurrence. The restricted malignancy of a growth of the spindle-cell type should encourage the surgeon to undertake its removal even when the size of the mass renders interference apparently hopeless.

Distinction between Primary and Secondary Growths.—It is sometimes hard to decide whether the growth has started in the stomach or has taken origin in some adjacent structure. Particularly is this the case with round-cell forms; rarely do sarcomata of the spindle-cell group present similar difficulties of interpretation. In reading the careful records of some cases of the former group, one is besieged by the doubt that the condition may not have been sarcomatous in the strict sense of the term, but a diffuse infiltration of the gastric walls in the course of a lymphocythæmia. There are many reasons for regarding both forms of leucocythæmia in their essential nature as closely akin to, if not identical with, neoplasia, and the possibility that the lymphatic type especially may be associated with tumour-like infiltrations of the viscera should be borne in mind. The clinical and pathological picture in a case described by Thursfield, for example, strongly suggests a

lymphocythæmia. A more common difficulty is that of distinguishing primary gastric new growths with secondary implication of adjacent glands, from the reverse condition of a primary sarcoma of glandular origin secondarily infiltrating the gastric walls. Each case must be judged on its merits, and, although it is only human to lean to the rarer and more interesting interpretation, most of the cases which we are inclined to regard as only secondarily affecting the stomach are so regarded by those who have placed them on record.

REFERENCES.

Bird. *Intercolon. Med. Journ.*, 1903, p. 78.
Brodowski. *Virchows Archiv*, 1876, Bd. 67.
Cantwell. *Ann. of Surg.*, 1899, ii. p. 596.
Cayley. *Trans. Path. Soc. Lond.*, 1869, vol. xx. p. 170.
Corner and Fairbank. *Trans. Path. Soc. Lond.*, 1905, vol. lvi. p. 20.
Fenwick. *Lancet*, 1901, i. p. 463.
Finlayson. *Brit. Med. Journ.*, 1899, ii. p. 1535.
Hadden. *Trans. Path. Soc. Lond.*, 1886, vol. xxxvii. p. 234.
Handford. *Trans. Path. Soc. Lond.*, 1889, vol. xl. p. 89.
Herman. *Trans. Obstet. Soc.* for 1901, vol. xliii.
Imperial Cancer Research Fund Scientific Reports, 1905, No. 2, Part i. p. 2, and p. 30.
Legg. *Trans. Path. Soc. Lond.*, 1874, vol. xxv. p. 121.
Lowe. *Brit. Med. Journ.*, 1886, ii. p. 1033.
Maass. *Deut. med. Woch.*, 1895, p. 34, V.B.
MacCormick and Welsh. *Austral. Med. Gaz.*, July 1906.
Mayo Robson and Moynihan. "Diseases of the Stomach," 1904, p. 155.
Miodowski. *Virchows Archiv*, 1903, Bd. 173, p. 156.
Morton. *Brit. Med. Journ.*, 1899, ii. p. 1083, and 1901, i. p. 1388.
Moser. *Deut. med. Woch.*, 1903, p. 133 and p. 157.
Salaman. *Trans. Path. Soc. Lond.*, 1904, vol. lv. p. 296.
Thursfield. *Trans. Path. Soc. Lond.*, 1901, vol. lii. p. 61.
Tilger. *Virchows Archiv*, 1893, Bd. 133, p. 183.
Virchow. "Die krankhaften Geschwülste," Berlin, 1864-65, Band ii. p. 351.
Wilks. *Trans. Path. Soc. Lond.*, 1859, vol. x. p. 146.
Wilson. *Brit. Med. Journ.*, 1901, i. p. 1137 (corrected p. 1242 and p. 1316).

TABULATED SUMMARY OF CASES.

(1) SARCOMATA OF THE ROUND-CELL GROUP.

Author.	Date.	Sex.	Age in Years.	Structure.	Stomach Site.	Other Sites.	Remarks.
Virchow . . .	1863	F	Young	small round	lesser curvature	ovaries, etc.	...
Cayley . . .	1869	M	57	round-cell	diffuse	glands	possibly lymphocythæmia.
Wickham Legg .	1874	F	17	round-cell	pyloric	liver, etc.	...
Hadden . . .	1886	F	53	lympho-	ant. wall	right lung	myoma uteri also.
Lowe	1886	M	62	round-cell	diffuse (?)	pancreas, etc.	doubtfully primary.
Handford . . .	1889	M	74	small round	diffuse	glands, etc.	probably secondary to glands.
Billroth (Tilger) . .	..	...	...	round-cell	ant. inf. wall	...	successfully removed.
Perry and Shaw (Tilger) (4 cases) . .	1891	...	...	round-cell	...	...	...
Török (Salaman) . .	1892	F	21	round-cell	...	...	successfully removed.
Maass	1895	M	18	lympho-	diffuse	glands, etc.	probably secondary to glands.
Brooks (Salaman) . .	1898	M	67	round-cell	...	none	in old bullet wound of stomach.
Morton . . .	1899	M	39	round-cell	diffuse	duodenum	successfully removed : well two years later.
Schopf (Mayo Robson and Moynihan) .	1899	F	...	lympho-	diffuse	glands (?)	successfully removed : well one year later.
Thursfield . . .	1901	M	3¾	small round	diffuse	kidneys, etc.	possibly lymphocythæmia.
Fenwick (2 cases) . .	1901	...	...	round-cell	...	...	...
Miodowski . . .	1903	F	40	large round	post. wall	...	operation : death.
Salaman (Case I.) .	1904	M	42	round-cell	diffuse	glands, etc.	probably secondary to glands.
,, (Case II.) .	1904	M	51	lympho-	diffuse	intestines, etc.	...

(2) Sarcomata of the Spindle-Cell Group.

Author.	Date.	Sex.	Age in Years.	Structure.	Stomach Site.	Other Sites.	Remarks.
Wilks	1859	F	18	recurrent fibroid	pyloric	ovaries	...
Virchow (Tilger) (2 cases)	1864	...	...	myo-sarcomata	greater curvature	...	...
Brodowski	1876	M	57	myo-sarcoma	greater curvature	liver	...
Hinterstoiser (Salaman)	1885	F	42	fibro-myxo-	...	...	...
Tilger (Case I.)	1893	F	78	spindle- and fibro-	ant. surface near greater curvature	none	...
,, (Case II.)	1893	F	50	small spindle	greater curvature	spleen, etc.	...
Weissblum (Tilger)	...	F	47	long spindle	cardia	liver	...
Malvoz (Tilger)	...	F	78	large spindle	lesser curvature	...	...
Kosinsky (Tilger)	...	...	...	myo-sarcoma	...	omentum	...
Hartley (Mayo Robson and Moynihan)	1896	F	54	spindle-cell	post. wall	none	successfully removed.
Cantwell	1899	F	52	spindle-cell	post. wall	none	successfully removed.
Finlayson	1899	M	3½	spindle and mixed cells	post. wall	none	...
Herman	1901	F	60	myxo-fibro-	greater curvature	none	successfully removed.
Alessandri (Salaman)	1903	F	53	fibro- or myo- (?)	greater curvature	...	successfully removed.
v. Eiselsberg (Moser)	...	...	...	myoma and fibro-sarcoma	fundus	...	successfully removed.
Moser (Case I.)	1903	F	41	myo-sarcoma	post. wall	pancreas	successfully removed.
,, (Case II.)	1903	F	17	myo-sarcoma	lesser curvature	none	operation: death.
,, (Case III.)	1903	M	50	myo-sarcoma	post. wall	none	died of cancer of adrenal.
Bird	1903	M	41	[1]mixed cell fibrifying	pyloric	duodenum	successfully removed: recurrence three years later.
MacCormick and Welsh (Case I.)	1906	F	53	spindle- and fibro-	post. wall	none	successfully removed: well five months later.
(Case II.)	1906	M	62	large spindle	post. wall	none	successfully removed: well two months later.
(Case III.)	1899	M	40	small spindle	post. wall and greater curvature	liver	no operation.

[1] We are indebted to Professor Allen, University of Melbourne, for the histological character of this growth.

Medical Education in Scotland

IN order to obtain in Scotland a legal qualification to practise medicine, the student must conform to the regulations of the General Medical Council; he must pass a preliminary examination recognised by the Council; must then register as a medical student; must study at a recognised medical school for a period of at least five years after registration; and having then obtained a registrable degree or diploma, this qualification must be recorded in the *Medical Register*.

Each University confers four registrable degrees: Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.)—which must be obtained and conferred at the same time, and which cannot be obtained until the candidate has attained the age of twenty-one years; Doctor of Medicine (M.D.); and Master of Surgery (Ch.M.). The three medical corporations, the Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons of Glasgow, co-operate in conducting conjoint examinations for the "Triple Qualification" (L.R.C.P.E., L.R.C.S.E., L.F.P.S.G.), which likewise admits to the *Medical Register*.

The Universities

PRELIMINARY EXAMINATION.—Each student must pass this examination before commencing medical study. At the matriculation office of each University, candidates can obtain schedules, which must be filled up and lodged not later than certain dates in March and September respectively. The fee for examination is 10s. 6d., and should be paid at the time of lodging the schedule. Candidates are examined on the following subjects:—

(1) *English.*—There is one paper comprising two questions on British History, two on Geography, four on Grammar (correction of sentences, parsing, analysis of sentences, and derivations), two of a literary and general nature, and the candidate has also to write an essay, and paraphrase a portion of verse. Answers are required to eight questions, and one answer in History, one in Geography, the essay, and the paraphrase are essential.

(2) *Latin.*—Translation, Parsing, Grammar, Prose Composition, and Sentences.

(3) *Elementary Mathematics.* — (*a*) Arithmetic (fractions,

proportion, percentage, square root, and simple interest); (*b*) Algebra (fractions, factors, square root, equations of the first degree, simultaneous equations of the first degree, quadratic equations and problems leading thereto); (*c*) Geometry (Euclid, Books I., II., and III., or their equivalents, with simple deductions).

(4) *Greek, or French or German.*

French or German.—Grammar, translation into English and into French or German, and short idiomatic sentences for translation from English.

Greek.—Grammar, translation into English, and of short sentences into Greek.

It is compulsory that the subjects be passed at not more than two examinations, but there is no restriction on the number of times the candidate may present himself for examination. A degree in Arts or Science in any University of the United Kingdom, and in any Colonial or Foreign University specially recognised; the Lower Grade Leaving Certificate of the Scottish Education Department, and certain other examinations, are accepted as equivalents for the preliminary examination. The preliminary examination conducted by the Educational Institute of Scotland is not accepted as an equivalent examination.

MATRICULATION.—Having passed the preliminary examination, the student must, within fifteen days after the commencement of the session, make the required entries in the Matriculation Album of the University, and pay the matriculation fee, which is one guinea for the whole year, half a guinea for the summer session alone. The student must matriculate each year of study.

REGISTRATION.—Within fifteen days after commencement of study, he must register as a medical student. He must be not less than sixteen years of age, must have passed the preliminary examination, and must produce to the Registrar (James Robertson, Esq., 54 George Square, Edinburgh) an application form duly filled up, showing that he has commenced medical study.

THE CARNEGIE TRUST.—This Trust is prepared to pay the class fees of students (who have passed the University preliminary examination) for all classes, whether attended within the Universities or in any of the Extra-Mural Schools. The Trust is also prepared to pay the class fees for students proceeding to the Triple Qualification, provided that the applicant has passed the preliminary examination recognised by the Trust. It is also prepared to pay the fees for the various special classes given by many of the Lecturers upon

advanced and non-compulsory subjects. Three qualifications are demanded: the applicant (1) must be over sixteen years of age; (2) must be of Scottish birth or extraction, or must have given two years' attendance after the age of fourteen at a school or institution under inspection of the Scottish Education Department; and (3) must be qualified by preliminary examination under the ordinances of the Scottish Universities Commission and the regulations of the Joint Board of Examiners, to attend the classes for which payment of fees has been claimed. Schedules of application for admission to the benefit of the Trust are obtainable by written application to the Secretary of the Trust, 14 Hanover Street, Edinburgh.

Professional Education at Edinburgh University

It is advisable for the student to commence study at the beginning of the summer session. The student who commences in summer should attend the classes in the following sequence:—

First Summer.— Elementary Botany and Zoology.
Examination in these subjects in July.

First Winter.— Chemistry and Practical Chemistry.
Physics (three months' course).
Anatomy Lectures.
Examination in Chemistry, Practical Chemistry, and Physics in March.

Second Summer.—Practical Anatomy—Histology—Hospital.

Second Winter.— Physiology (Lectures, Practical Chemical and Practical Experimental Physiology), Practical Anatomy, Surgery,[1] Hospital and Clinical Surgery (after Christmas).

Third Summer.— Practical Anatomy, Practical Materia Medica, Clinical Surgery and Surgical Ward Work.

Third Winter.— Anatomy (Practical and Demonstrations), Materia Medica, Clinical Surgery, and Surgical Ward Work (up to Christmas).
Examination in Anatomy and Physiology in March.
Practical Pathology, Clinical Medicine and Medical Ward Work, Dispensary.
Examination in Materia Medica in July.

[1] Or in the third Winter Session.

Fourth Winter.— Pathology, Post-Mortems, Practice of Medicine, Midwifery and Gynæcology, Clinical Medicine and Ward Work.
Examination in Pathology in March.

Fifth Summer.— Forensic Medicine, Public Health, Hospital and Clinical Medicine, Ophthalmology, Diseases of Children (or Larynx, Ear, and Nose, or Skin), Mental Diseases.

Fifth Winter and Final Summer.—
Hospital and Clinical Medicine, Dispensary. Vaccination, Fevers, Practical Midwifery, Operative Surgery (in summer).
Examinations in Surgery and Clinical Surgery, Medicine and Clinical Medicine, Midwifery and Gynæcology, Forensic Medicine and Public Health in April, May, and June.

If the student commences in winter, the course of study is as follows:—

First Winter.— Physics (three months), Chemistry and Practical Chemistry, Anatomy (Lectures and Practical).
Examination in Chemistry, Practical Chemistry, and Physics in March.

First Summer.— Elementary Botany and Zoology.
Examination in these subjects in July.

Second Winter.— Same as above-mentioned second winter.

Second Summer.—Same as above-mentioned third summer, with in addition Practical Physiology (Histology).

And thereafter as in the above-mentioned Winter and Summer Sessions.

The candidate must attend Hospital for not less than three years; must attend both Clinical Medicine and Clinical Surgery for a period of at least nine months; twelve cases of Midwifery, or six cases and three months' attendance at a Maternity Hospital; and Post-Mortem Examinations for three months.

Two of the five years of study must be spent at the University, and not less than eight of the compulsory subjects of study must be taken in the University.

The University degrees are now conferred on Women Students. They do not attend the classes in the University, but at the Medical College for Women, Minto House, which is

recognised by the University Court as a Medical School whose courses of instruction qualify for graduation in medicine.

PROFESSIONAL EXAMINATIONS FOR M.B. AND CH.B.

First Examination.— Botany, Zoology, Physics, and Chemistry.
Second Examination.—Anatomy, Physiology, Materia Medica, and Therapeutics.
Third Examination.—Pathology.
Final Examination.—Medicine and Clinical Medicine, Surgery and Clinical Surgery, Midwifery and Gynæcology, Forensic Medicine and Public Health.

The candidate may pass in one or more subjects of an examination, even though he fail in the other subjects. The minimum expense for M.B. and Ch.B., including fees for Classes, Hospital, Matriculation, and Examination, amounts to about £143.

DEGREE OF M.D.

Each candidate for this degree, under the new regulations, must be of the age of twenty-four years or upwards, and must have obtained the degrees of M.B. and Ch.B. of the University. He must either have been engaged for two years in general practice, *or* for one year in the naval or military medical services, or in the medical wards of a hospital, or in scientific research. He must present a thesis written by himself on a medical subject, and pass an examination in Clinical Medicine. In this examination the candidate has to write a report and commentary on at least three cases, and has to show a practical knowledge in the applications of the ophthalmoscope, laryngoscope, electrical apparatus, and sphygmograph, in the examination of the blood, and in the chemical and microscopical examination of the excreta.

The candidate who has graduated M.B. and C.M. under the old regulations may either proceed to the degree of M.D. under the old regulations (under which he is not required to pass an examination in Clinical Medicine, but must have passed examinations in Greek and in Logic or Moral Philosophy), or he may proceed to the degree as if he had graduated M.B., Ch.B. under the new regulations.

DEGREE OF CH.M.

Each candidate must be not less than twenty-four years of age, must possess the degrees of M.B., Ch.B., must have

attended the surgical wards of a hospital for one year, or have spent one year in scientific research or in the naval or military medical services, or two years in practice other than that restricted to medicine. He must submit a thesis on a surgical subject, and pass an examination on clinical surgery and its branches, surgical anatomy, and operations on the dead body.

Fees for M.D. and Ch.M.

The fee for the M.D. degree under the old regulations is five guineas; for the M.D. or Ch.M., under the new regulations, ten guineas. The candidate must have paid the matriculation fee for the year in which he presents himself for examination or graduation. At each reappearance for examination, under the new regulations, the fee is five guineas.

DEGREES IN PUBLIC HEALTH.

Two degrees are granted by the University of Edinburgh in the department of Sanitary Science, viz., B.Sc. and D.Sc.

Bachelor of Science.

Candidates must be graduates in Medicine of a University of the United Kingdom or of some other recognised University. In order to obtain the degree, two examinations have to be passed.

First Examination.—Before entering for this examination, the candidate must, after graduating in Medicine, have worked in a recognised Public Health Laboratory for eight months, of which five consecutive months must be passed in the Public Health Laboratory of the University of Edinburgh.

He must also have attended in a Scottish University a course of lectures on Physics and a course of lectures on Geology, extending over three months, and both of which are approved of by the University Court.

The subjects of examination are as follows:—

(1) *Laboratory* work—Practical, written, and oral; examination of water, air, foods, beverages, condiments, sewage; soils; disinfectants; building materials; clothing; bacteriology.

(2) Physics. (3) Geology.

Second Examination.—This cannot be taken until eighteen months after graduating in medicine; nor sooner than six months after passing the First B.Sc. Examination. The candi-

date must have attended two separate courses on Public Health, either in the University of Edinburgh or in some other recognised University or School.

Each course must consist of forty lectures, and includes Medicine in its relation to Public Health and Sanitary Engineering.

The candidate must likewise produce evidence that (1) for six months he has studied sanitary work under a Medical Officer of Health for a county or burgh of not less than 25,000 inhabitants; (2) that he has studied clinically for three months infectious diseases in a recognised institution; (3) that for three months he has been instructed by a recognised teacher in mensuration and drawing.

The subjects of examination are:—

(1) Sanitation; (2) Sanitary Law; (3) Vital Statistics; (4) Medicine in relation to Public Health.

The candidate is examined orally, practically, and by a written paper. *Sanitation* includes making reports on dwellings, workshops, hospitals, and sanitary schemes.

The University Court may modify the work and instruction prescribed from time to time.

Doctor of Science.

A graduate after having held the degree of B.Sc. for five years may present himself for the D.Sc. He must present a thesis or a published work or memoirs, the result of his own research, and must pass an examination in Public Health, and in such of its special subjects as the Senatus may determine. The candidate must submit the subject in which he proposes to be examined for approval not less than two months before the examination.

Fees Payable.—First and second examinations, £3, 3s. each; for D.Sc., £10, 10s.

Institutions for Clinical Instruction in Edinburgh

Royal Infirmary. 740 beds and 40 cots. Fees—perpetual ticket, £12; one year, £6, 6s.; six months, £4, 4s.; three months, £2, 2s. Clinical instruction is given daily in Medicine, Surgery, and all their special branches.

Royal Hospital for Sick Children. 120 beds. Hospital ticket, £1, 1s. Fee for Qualifying Course, £2, 2s.

City Hospital for Infectious Diseases. 600 beds. Fee, £1, 1s.

Royal Maternity and Simpson Memorial Hospital. 40 beds.

The Maternity Residency affords accommodation for twelve students.

Royal Asylum, Morningside. 500 beds.

The fee for a qualifying course at each of these last two institutions is £2, 2s.

Victoria Hospital for Consumption and Diseases of the Chest, 50 beds. Out-patient Department at 26 Lauriston Place.

Eye, Ear, and Throat Infirmary. 6 beds; 2700 Out-Patients yearly. Fee for three months, £1, 1s.

Royal, New Town, Medical Missionary (Cowgate), Western, Provident (Marshall Street), Eye, and Skin Dispensaries.

Professors and Lecturers in Edinburgh

The courses given by the Extra-Mural Lecturers are recognised by the University and other examining boards as qualifying for graduation.

Botany— Professor Bayley Balfour, M.D., Botanical Gardens.

Zoology— Professor J. Cossar Ewart, M.D., University.
Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Minto House.

Biology— Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Medical College for Women, Minto House.

Physics— Professor J. G. MacGregor, D.Sc., University.
C. G. Knott, D.Sc., University.
Dawson Turner, M.D., Surgeons' Hall.

Chemistry— Professor Crum Brown, M.D., University.
J. Falconer King, F.C.S., Minto House.
G. H. Gemmell, F.I.C., 4 Lindsay Place.
James Kerr, B.Sc., Surgeons' Hall.
T. W. Drinkwater, Ph.D., 5 Teviot Place.

Anatomy— Professor D. J. Cunningham, M.D., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.

Applied Anatomy—
H. J. Stiles, M.B., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.

Physiology— Professor E. A. Schäfer, LL.D., University.
(Vacant) Surgeons' Hall.

Chemical Physiology—
W. Cramer, Ch.B., University.
(Vacant) Surgeons' Hall.

Experimental Physiology—
(Vacant) Surgeons' Hall.
Sutherland Simpson, M.D., University.

Histology— (Vacant) Surgeons' Hall.
P. T. Herring, M.D., University.

Materia Medica and Therapeutics—
Professor Sir Thomas R. Fraser, M.D., University.
William Craig, M.D., Surgeons' Hall.
Francis D. Boyd, C.M.G., M.D., New School.

Pathology— Professor W. S. Greenfield, M.D., University.
W. Russell, M.D., Medical College for Women.
Theodore Shennan, M.D., Surgeons' Hall.
Stuart M'Donald, M.B., New School.

Surgery— Professor J. Chiene, C.B., M.D., University.
F. M. Caird, F.R.C.S., New School.
J. W. B. Hodsdon, F.R.C.S., Surgeons' Hall.
H. Alexis Thomson, F.R.C.S., Minto House.
David Wallace, C.M.G., F.R.C.S., Nicolson Square.
Alex. Miles, F.R.C.S., New School.
J. W. Dowden, F.R.C.S., Medical College for Women.
A. A. Scot Skirving, C.M.G., F.R.C.S., 27 Nicolson Square.

Clinical Surgery—
Professor Annandale, F.R.C.S., Royal Infirmary.
C. W. MacGillivray, F.R.C.S., ,,
J. M. Cotterill, F.R.C.S., ,,
C. W. Cathcart, F.R.C.S., ,,
F. M. Caird, F.R.C.S., ,,

Practice of Medicine—
Professor J. Wyllie, M.D., University.
Alex. James, M.D., New School.
Byrom Bramwell, M.D., New School.
G. A. Gibson, M.D., Minto House.
Alex. Bruce, M.D., Surgeons' Hall.
R. W. Philip, M.D., New School.
R. A. Fleming, M.D., 27 Nicolson Square.

Clinical Medicine—
The Physicians of the Royal Infirmary.

Midwifery and Gynæcology—
Professor Sir J. Halliday Croom, M.D., University.
D. Berry Hart, M.D., Surgeons' Hall.

J. W. Ballantyne, M.D., Surgeons' Hall.
A. H. F. Barbour, M.D., University.
F. W. N. Haultain, M.D., New School.
J. Haig Ferguson, M.D., New School.
W. Fordyce, M.D., New School.
N. T. Brewis, F.R.C.S., 5 Cambridge Street.
E. M. Inglis, M.B., Surgeons' Hall.
Malcolm Campbell, F.R.C.S., Minto House.

Insanity— T. S. Clouston, M.D., University and Royal Asylum.
Sir J. Batty Tuke, M.D., and G. M. Robertson, M.D., Surgeons' Hall and Stirling District Asylum, Larbert.

Diseases of the Eye—
G. Mackay, M.D., University and Royal Infirmary.
W. G. Sym, M.D., Royal Infirmary.
A. H. H. Sinclair, M.D. (Ophthalmoscopy), 45 Lauriston Place.

Vaccination—J. B. Buist, M.D., Western and Cowgate Dispensaries.
W. G. Aitchison Robertson, M.D., D.Sc., Royal Dispensary.

Diseases of Children—
Staff of the Sick Children's Hospital.

Diseases of the Skin—
Norman Walker, M.D., Royal Infirmary.
Frederick Gardiner, M.D.

Diseases of the Ear, Nose, and Throat—
A. Logan Turner, M.D., Royal Infirmary.
J. Malcolm Farquharson, M.B., New School.

Forensic Medicine—
Professor Harvey Littlejohn, F.R.C.S., University.
W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.
C. J. Lewis, M.D., D.Sc., Surgeons' Hall.

Public Health—
W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.
Professor C. Hunter Stewart, M.B., University.

Fevers—J. O. Affleck, M.D., City Hospital.
C. B. Ker, M.D., Surgeons' Hall.

Bacteriology.—
J. M. Beattie, M.D., University.
T. Shennan, M.D., Surgeons' Hall.
J. Taylor Grant, M.D., 4 Lindsay Place.
Stuart Macdonald, M.B., New School.

Diseases of Tropical Climates—
A. Davidson, M.D., University.
Major D. G. Marshall, I.M.S., Surgeons' Hall.

Practical Medicine and Physical Diagnosis—
R. W. Philip, M.D., and G. Lovell Gulland, M.D., New School.
R. A. Fleming, M.D., Nicolson Square.

Neurology— J. J. Graham Brown, M.D., New School.

Diseases of the Chest—
R. W. Philip, M.D., 26 Lauriston Place.
G. Lovell Gulland, M.D., 26 Lauriston Place.

Medical Electricity and Röntgen Rays—
Dawson Turner, M.D., Surgeons' Hall.

Diseases of the Blood—
G. Lovell Gulland, M.D., Surgeons' Hall.

Practical Anæsthetics—
T. D. Luke, M.B., University.

Glasgow University

The medical curriculum at the University extends over five years, and the classes are held in the handsome buildings at Gilmorehill, adjacent to which lies the Western Infirmary, where there is an excellent field for clinical and practical work.

The Faculty of Medicine embraces the classes of Botany, Zoology, Physics, Chemistry, Anatomy, Embryology, Physiology, Materia Medica and Therapeutics, Pathology, Medical Jurisprudence and Public Health, Surgery, Clinical Surgery, Practice of Medicine, Clinical Medicine, Midwifery, Insanity, Diseases of the Eye, Diseases of the Ear, Diseases of the Throat and Nose, Diseases of the Skin, and Diseases of Children.

The cost of the medical curriculum is about £126.

Before the commencement of medical and surgical studies the preliminary examination has to be passed. The names of candidates for this examination must be given in and the fee of 10s. 6d. paid to the assistant clerk at the Matriculation Office. At the Matriculation Office successful students can obtain the

registration forms, which must be filled up and sent to 54 George Square, Edinburgh.

The University of Glasgow offers many attractions to students. The professorial chairs are occupied by able men, some of them of world-wide renown; and in the Western Infirmary, with the recent additions to its surgical theatres and its excellent pathological laboratories and museum, a splendid field of observation is open to the student. There are also extremely good opportunities for practical work in the various dispensaries of the city, in the Maternity Hospital with its large out-door department, and also at the Royal Hospital for Sick Children, the Eye Infirmary, and the Royal Asylum at Gartnavel.

The Students' Union, situated in the University grounds, is very convenient, and much taken advantage of.

Lodgings are to be found all round the neighbourhood, so that the whole life of the student, his work and his recreation, is drawn into a small circle, within which he can move as busily and as profitably to himself as in any teaching school in the kingdom.

Queen Margaret College for Women

A full course of medicine and surgery is obtainable. The regulations, fees, etc., are similar to those for men. The buildings are pleasantly situated in grounds of their own, close to the Botanic Gardens. The anatomical department is excellently arranged and most complete. Clinical work is amply provided for in the Royal Infirmary and its Dispensaries, and in the Royal Hospital for Sick Children, the Glasgow Maternity Hospital, the Royal Asylum of Gartnavel, and the Belvidere Fever Hospital. There are also arrangements for special study and research.

Students can have board and lodging at Queen Margaret Hall, within easy reach of the College, at the rate of about one guinea per week.

All information necessary can be obtained from Miss Galloway, Queen Margaret College, Glasgow.

St Mungo's College Medical School

86 Castle Street, Glasgow (within the Grounds of the Glasgow Royal Infirmary)

St Mungo's College was the outcome of the Royal Infirmary Medical School which was opened in 1876. The venerable Infirmary has now actively existed for one hundred and six

years, and the students of St Mungo have peculiarly good opportunities for practical and clinical work in the wards and dispensaries. To the Royal Infirmary a large number of accidents are admitted, and numerous medical cases of all kinds; and for students, and more especially for house-surgeons and house-physicians, the practical experience is abundant. St Mungo's College buildings are attached to the Dispensary and adjacent to the Infirmary. All information regarding classes, fees, etc., can be obtained from the Dean, St Mungo's College, 86 Castle Street. The classes are for male students only. The class-rooms and laboratories have accommodation for 300 or 400 students. The anatomical department consists of large, well-lighted dissecting-rooms, a lecture-room, and osteology gallery and museum. There are also chemical, physiological, zoological, and botanical laboratories. In the adjacent dispensaries fully 40,000 patients are seen yearly. Students can also have access to the well-equipped Pathological Museum and Laboratory of the Infirmary, and the bacteriological department.

The bursaries are few in number, but the class fees are moderate, averaging two guineas for a winter course, while the combined theoretical and practical courses of anatomy, zoology, physiology and pathology are four guineas each.

A Public Health Laboratory is also open to students for a complete course in practical work, and there are two lectureships on this subject, so that those who desire may conform to the new regulations of the Medical Council and the requirements of the examining board. Excellent instruction in fevers can be obtained at Ruchill and Belvidere Hospitals. Dressers and clerks are chosen from the students for work in the wards of the Infirmary. The close proximity of the Maternity Hospital, Rottenrow, affords excellent opportunities for clinical demonstrations, which form a considerable and unique addition to the ordinary course of systematic instruction in midwifery.

LECTURES AND DEMONSTRATIONS.

WINTER SESSION.

Elementary Physics—Professor Blyth.
Chemistry—Professor A. W. C. Menzies.
Zoology—Professor King.
Practical Zoology—Professor King.
Senior Anatomy—Professor Alex. Macphail.
Junior Anatomy—Professor Alex. Macphail.
Practical Anatomy—Professor Alex. Macphail.
Surgery—Professor Henry E. Clark.
Physiology—Professor Farquharson.

Clinical Surgery—Professor D. N. Knox.
Practice of Medicine—Professor T. K. Monro.
Clinical Medicine—Professor D. C. M'Vail.
Materia Medica—Professor Dougall.
Pathology—Professor Workman.
Midwifery—Professor Robert Jardine.
Ophthalmology—Professor Maitland Ramsay.
Gynæcology—Dr James K. Kelly.
Throat and Nose—Dr Fullerton.
Public Health Laboratory—Professor Galt.
Public Health—Professor Galt.

Bacteriology, if desired. *Hospital Dispensary*, daily.

SUMMER SESSION.

Practical Pathology—Professor Workman.
Botany—Professor Jas. Swanson.
Practical Botany—Professor Jas. Swanson.
Practical Chemistry—Professor A. W. C. Menzies.
Practical Physiology—Professor Farquharson.
Clinical Surgery—Professor D. N. Knox.
Operative Surgery—Professor Henry E. Clark.
Surgical Diseases of Children—Dr James A. Adams
Clinical Medicine—Professor D. C. M'Vail.
Anatomy—Professor Alex. Macphail.
Demonstrations—Professor Alex. Macphail.
Practical Anatomy—Professor Alex. Macphail.
Osteology—Professor Alex. Macphail.
Forensic Medicine and Hygiene—Professor Galt.
Dermatology—Dr Alex. Morton.
Otology—Dr J. Kerr Love.
Bacteriology—Dr David M'Crorie.
Psychological Medicine—Dr Hamilton C. Marr.
Hospital Dispensary, daily.

Anderson's College Medical School

Dumbarton Road, Partick, Glasgow

The old institution known as "Anderson's University" was founded by John Anderson, M.A., F.R.S., in 1726, and the medical school connected therewith dates back to the year 1800.

In 1877 the name of the Institution was altered from

"Anderson's University" to "Anderson's College." In 1887 the medical school of Anderson's College became a distinct Institution known as "Anderson's College Medical School."

The new buildings are situated in Dumbarton Road, immediately to the west of the entrance of the Western Infirmary and four minutes' walk from the University. They are constructed on the best modern principles, and are provided with all the appliances requisite for the conduct and management of a fully equipped medical school.

Classes are conducted in all the subjects of the five years' curriculum :—

Anatomy—Professor A. M. Buchanan, M.A., M.D.
Physics—Professor Peter Bennett.
Chemistry—Professor J. Robertson Watson, M.A.
Botany—Professor B. G. Cormack, M.A., B.Sc.
Zoology—Professor Geo. Bell Todd, M.B.
Physiology—Professor Robert Fullarton, M.A., M.B.
Materia Medica—Professor Hugh M'Laren, M.B.
Medical Jurisprudence and Hygiene—Professor Carstairs Douglas, D.Sc., M.D., F.R.S.E.
Midwifery—Professor John Edgar, M.A., B.Sc., M.B.
Surgery—Professor J. H. Nicoll, M.B.
Practice of Medicine—Professor R. Barclay Ness, M.A., M.B.
Ophthalmic Medicine and Surgery—T. Spence Meighan, M.B.
Aural Surgery—James Galbraith Connal, M.B.
Diseases of Throat and Nose—John Macintyre, M.B., F.R.S.E.
Mental Diseases—John Carswell, F.F.P.S.G.
Public Health Laboratory—Professor Carstairs Douglas, B.Sc., M.D., F.R.S.E.
Pathology—At the Western or Royal Infirmary.

Degrees and diplomas.—Certificates of attendance on the classes at Anderson's College Medical School are received by the Universities of London and Durham, by the Royal University of Ireland, and by all the Royal Colleges and Licensing Boards in the United Kingdom. They are also recognised by the Universities of Glasgow and Edinburgh under certain conditions which are stated in the calendar of this school. The Public Health Laboratory Course is recognised as qualifying for the Diploma granted by the University of Cambridge and by the Scottish Conjoint Board.

Candidates for the Licence in Dental Surgery can obtain at this school the full medical curriculum which is required. The courses special to dentistry are conducted at the Glasgow Dental School, 15 Dalhousie Street.

Malcolm Kerr Bursary in Anatomy. Value about £10. Open to students of the junior anatomy class during session 1905-1906.

The Carnegie Trust will pay the fees of students at Anderson's, on conditions, regarding which particulars may be obtained from W. S. M'Cormick, LL.D., Carnegie Trust Offices, Edinburgh.

Class fees.—For each course of lectures (anatomy, ophthalmic medicine and surgery, aural surgery, diseases of throat and nose and mental diseases excepted): first session, £2, 2s.; second session (in Anderson's College), £1, 1s.; afterwards free. For practical classes (except anatomy), viz., chemistry, botany, zoology, physiology, pharmacy, operative surgery: first session, £2, 2s.; second session, £2, 2s.

Reduced joint fees in zoology and in botany, for lectures and practical class when taken in same summer session, £3, 3s.; for either course separately, £2, 2s.

Anatomy class fees.—Winter—first session (including practical anatomy), £4, 4s.; second session (including practical anatomy), £4, 4s.; third session, £2, 2s.

Summer—lectures and practical anatomy, £2, 12s. 6d.; lectures alone, £1, 11s. 6d.; practical anatomy alone, £1, 11s. 6d.; osteology and practical anatomy, £2, 12s. 6d.; osteology alone, £1, 11s. 6d.; practical anatomy alone, £1, 11s. 6d.

Ophthalmic medicine and surgery (including hospital practice), *Aural surgery*, *Diseases of throat and nose and Mental diseases*, £1, 1s.

Matriculation fee.—Winter, 10s.; for summer session only, 5s.

Aberdeen University

The course of study for the degree of M.B., Ch.B. extends over five years, of which two at least must be spent in the University of Aberdeen.

The curriculum is the same as in the other Scottish Universities as far as relates to attendance on University classes, to clinical study at a General Hospital, to attendance on courses of Clinical Surgery, Clinical Medicine, Mental Diseases, and Practical Pharmacy, to instruction in Vaccination, to attendance on Cases of Labour, and to the practice of a Dispensary.

The candidate must also, before admission to the final examination, produce the following certificates:—

(1) That he has acted as clerk in the Medical and Dresser in the Surgical Wards of a Public Hospital, each for a period equivalent to one Winter Session.

(2) That he has been present at not fewer than twenty-five post-mortem examinations at a Hospital or Dispensary, some of which he must have taken part in performing.

(3) That he has attended for at least three months the practice of a General Fever Hospital with not fewer than forty beds.

(4) That he has attended for at least three months a course of clinical instruction in the Diseases of Children.

(5) That he has attended for at least three months the Ophthalmological practice of a Hospital or Dispensary, where special provision is made for giving instruction.

Certificates for these various classes and courses must attest not only regular attendance, but also due performance of the work.

There is no prescribed order of study, but a scheme, representing the minimum curriculum, has been drawn up for the guidance of students, and is printed in the Calendar.

The following are the Classes in the Medical Faculty:—

WINTER SESSION.

Zoology—Professor John Arthur Thomson, M.A.
Chemistry—Professor Japp, M.A., LL.D., F.R.S.
Anatomy—Professor Reid, M.D., F.R.C.S.
Practical Anatomy—Professor Reid and Assistants.
Physiology (*Syst. and Pract.*)—Professor MacWilliam, M.D.
Materia Medica—Professor Cash, M.D., F.R.S.
Pathology (*Syst. and Pract.*) — Professor Hamilton, M.B. F.R.C.S., F.R.S.E.
Surgery—Professor Ogston, C.M., M.D.
Medicine—Professor Finlay, B.A., M.D., F.R.C.P. Lond.
Midwifery and Diseases of Women and Children—Professor Stephenson, M.D., F.R.C.S.

SUMMER SESSION.

Botany—Professor Trail, M.A., M.D., F.L.S., F.R.S.
Practical Botany—Professor Trail.
Zoology—Professor Thomson.
Practical Zoology—Professor Thomson.
Physics—Professor Niven, M.A., D.Sc., F.R.S.
Practical Chemistry—Professor Japp and Assistants.
Practical Anatomy—Professor Reid and Assistants.
Practical Materia Medica and Pharmacy—Professor Cash and Assistants.
Physiology (*Syst. and Pract.*)—Professor MacWilliam.
Forensic Medicine—Professor Hay, M.D.

Practical Hygiene and Forensic Medicine—Professor Hay.
Pathology (*Syst. and Pract.*)—Professor Hamilton.
Practical Midwifery and Gynæcology and Clinical Diseases of Children—Professor Stephenson.
Tropical Medicine—Dr G. A. Maconachie, Lecturer.

Systematic and Practical Pathology, and Systematic and Practical Physiology respectively are now taught as part of one continuous course, occupying a whole academic year, *i.e.* a summer and a winter session.

There are Assistants to the Professors in the Medical Faculty appointed annually, two in the department of Anatomy, Physiology, Materia Medica, and Chemistry, and one in each of the other departments.

The following are recognised as Lecturers—

Lecturer on	Mental Diseases .	Wm. Reid, M.D.
„	Ophthalmology . .	C. H. Usher, M.B., B.S., F.R.C.S.
„	Vaccination . .	R. G. M'Kerron, M.A., M.D.
„	Skin Diseases . .	J. F. Christie, M.A., M.B., C.M.
„	Diseases of Ear, Throat, and Nose . .	J. Mackenzie Booth, M.D., C.M.
„	Ophthalmology . .	A. Rudolph Galloway, M.A., M.B., C.M.

All the University Classes are held at Marischal College.

Tutorial Classes are held in connection with most of the Systematic Courses, and practical instruction is given in the fully-equipped Laboratories connected with the several departments.

Graduates or others desirous of engaging in special study or research may be allowed by the Senatus to work in any of the Laboratories.

General clinical instruction is obtained in the following Medical Institutions:—

The Royal Infirmary of Aberdeen.

This General Hospital, situated about seven minutes' walk from Marischal College, has been recently constructed on the most modern principles, and is fully equipped with all the requirements for medical work and teaching. It accommodates upwards of two hundred patients; the number of patients admitted during the year 1903 was 2906, and the number of out-patients treated during the same period was 12,489.

Four resident medical officers are appointed annually, two in May and two in August, to hold office for twelve months. Salary, £25 with board.

Fees.—Perpetual fee to hospital practice, £6, or first year £3, 10s., second year, £3, afterwards free; clerkship in medicine, £1, 1s.; dressership in surgery, £1, 1s.; pathological demonstrations, £2, 2s. (Special courses of lectures are charged for.)

The Royal Hospital for Sick Children

Is situated about five minutes' walk from Marischal College, and accommodates over 80 patients. The number of patients admitted in 1904 was 720, and the number of out-patients treated 1652. No infectious disease except diphtheria is treated. Each student must act as clerk for six weeks in the medical and surgical wards respectively.

There is one qualified house physician and surgeon (resident) who holds office for six months. Salary at the rate of £25 per annum.

Fee for hospital practice, £2, 2s. first year; subsequent years, £1, 1s.

The Royal Asylum

Is about fifteen minutes' walk from Marischal College. It accommodates over 950 patients, and has been recently fitted up with a fully equipped hospital and a laboratory.

The senior physician is recognised by the University as lecturer on mental diseases, and delivers a qualifying course of lectures.

The City (Fever) Hospital

Is about ten minutes' walk from Marischal College, and accommodates 100 patients.

Senior students are admitted for instruction in fevers twice a week under the visiting physician (who is the Medical Officer of Health for the City) and his assistant. Fee, £1, 1s.

General Dispensary, Maternity Hospital, and Vaccine Institution.

This is about five minutes' walk from Marischal College.

The total number of cases treated during 1904 was 12,892, and the number of patients treated at their own homes, 3239. There were 379 midwifery cases.

Fees.—Perpetual Fee, £3, 3s.; vaccination certificate and instruction, £1, 1s.; for special courses, *v. supra.*

Ophthalmic Institution.

This institution is situated about three minutes' walk from Marischal College. The surgeon in charge is recognised by the University as a lecturer on ophthalmology.

During 1903, 50 in-patients and 3680 out-patients were treated.

PROFESSIONAL EXAMINATIONS.

There are four examinations: the subjects and regulations of these are common to all the Scottish Universities.

Diploma in Public Health (D.P.H.).

The diploma is conferred, after special instruction and examination, on any one who has been at least twelve months a graduate in medicine of a university in the United Kingdom; if not a graduate of Aberdeen University, the candidate must attend a course of instruction in this University in one or more subjects embraced in the examination for the diploma.

Each candidate must have attended a course of instruction in Public Health.

The qualifying post-graduate instruction embraces:

(α) Regular attendance, for three months, at a hospital for infectious diseases, at which opportunities are afforded for the study of methods of administration.

(β) Daily association for a period of six months (of which at least three months must be distinct from the period of laboratory instruction) in the duty, routine and special, of Public Health Administration, under the supervision of a recognised Medical Officer of Health.

(γ) Practical instruction, for at least six months, in laboratory work, which includes examination of water, air, soil, and foods, and the study of bacteriology, disinfection, ventilation water supply, and sewerage, and the framing of reports of analysis. The laboratory attendance must extend over at least fifteen hours a week.

The qualifying courses of laboratory instruction in Aberdeen University are given in the Public Health Laboratory (Fee, £6, 6s.), and the Bacteriological Laboratory (Fee, £4, 4s.).

The diploma is conferred after an examination in March and July of each year.

The examination is written, oral and practical, and is divided into two parts.

Part I. embraces the following subjects in their application to Public Health :—

(α) Physics, Engineering, and Meteorology.
(β) Chemistry, Microscopy, and Bacteriology.

Part II. embraces :—

(α) General Hygiene.
(β) Sanitary Law and Vital Statistics.

Part I. may be taken alone, or both parts together.

The written examinations occupy two days, and the oral and laboratory and outdoor examination three to four days.

Candidates must send in their names and pay the fees a fortnight before the examination. Examination fee is five guineas. Re-examination fee one guinea.

SUMMARY OF FEES.

I. University Fees.

(α) Preliminary Examination (each occasion)			£0	10 6
(β) Matriculation—For whole year			1	1 0
For Summer Session			0	10 6
(γ) Class Fees—				
Each Systematic Course—For Winter or Full Course			4	4 0
Each subsequent attendance			3	3 0
For Summer or Half-Course			3	3 0
Each subsequent attendance			3	3 0
Each Practical Course and sub. attendance			3	3 0
Except Practical Anatomy in Summer			2	2 0
Except Practical Midwifery			2	2 0
(δ) Degree Fees—For M.B., Ch.B.—				
1st Professional Exam.	£5 5 0			
2nd " "	5 5 0			
3rd " "	5 5 0			
4th " "	7 7 0			
			23	2 0
Re-examination fee for not more than two subjects			1	1 0
" for each additional subject			0	10 6
For M.D.			10	10 0
For Ch.M.			10	10 0
Re-examination Fee			2	2 0

II. Non-University Fees.

Royal Infirmary—Perpetual Fee	6	0	0
Children's Hospital	2	2	0
Dispensary—Perpetual Fee	3	3	0
City (Fever) Hospital	1	1	0
Lectures on clinical medicine—Winter Session	4	4	0
" " " Summer "	3	3	0
" clinical surgery—Winter Session	4	4	0
" " " Summer "	3	3	0
Clerkship at Royal Infirmary	1	1	0
Dressership " "	1	1	0
Course of Lectures on { Mental diseases; Tropical Medicine; Diseases of eye; Diseases of ear and throat; Diseases of skin } Each	2	2	0
Instruction in { Clinical Gynæcology; Medical electricity; Anæsthetics; Dental surgery; Post-mortem room }			
Instruction in vaccination	1	1	0

The cost of matriculation, class, and hospital fees for the whole curriculum, exclusive of fees for degrees, is usually about £120.

University of St Andrews

The medical degrees are the same as those of the other Scottish universities, and they are granted under similar conditions. The graduation fees for the degree of M.B., Ch.B. amount to twenty-two guineas, and for M.D. or Ch.M. ten guineas.

United College, St Andrews, affords considerable facilities to students beginning a medical course, especially if they are willing to combine it with a preliminary two years of study for an Arts or Science degree. Under the new regulations, which make it possible to study botany, zoology, chemistry, and physics as part of the course for an M.A. degree, the medical student can, during the early years of his medical course, hold some of the many bursaries or scholarships which the University of St Andrews has to offer. For women, the large number of Taylour Thomson bursaries, to which female medical students have a preference, makes the course in St Andrews specially advan-

tageous. There are several £20 bursaries for men. The cost of rooms and living is considerably under that in the larger towns. For women there is an excellent residential hall, and other students may attend the common dinners in the Union. The medical course in St Andrews extends over two years, and embraces all the subjects of the first two professional examinations. The other subjects must be studied elsewhere, but the student may take all the examinations in the University and graduate there. There are special buildings for the Medical School.

University College, Dundee, supplies a complete course of medical study, whether the student graduate at the University (St Andrews) or not. Several bursaries are offered for competition among the medical students. Large and commodious new buildings for this medical school, with well equipped laboratories and dissecting room, afford ample scope for study. Besides that supervision of individual students which larger schools cannot offer, there are unrivalled opportunities for clinical and outpatient work in the Royal Infirmary. Already this institution is provided with over 300 beds, including special wards for obstetrics, gynæcology, children's diseases, ophthalmology, and other special departments.

In addition to this, a large new building, now finished, but as yet unfurnished, will provide an additional 120 beds and quarters for special research. There is a large outdoor maternity department, and there are dispensaries which are largely attended in the various districts of the city.

The large asylum at Liff provides material for instruction in mental diseases, and the epidemic hospital for that in fevers. There is also the Royal Victoria Hospital, where patients suffering from incurable diseases can be visited.

The classes at the United College, St Andrews, are:— Natural philosophy; practical physics; chemistry; practical chemistry; natural history; practical zoology (when taken along with the ordinary classes the fee for each of these three practical classes is £1, 1s.); botany; practical botany; physiology; anatomy; practical anatomy; materia medica; practical materia medica.

ST ANDREWS

Professors and Lecturers.

Physics— Professor Butler.
Chemistry— Professor Purdie.
Zoology— Professor Mackintosh.

Botany Lecturer—
Mr R. A. Robertson.
Physiology, Histology, and Physiological Chemistry—
Dr D. F. Harris.
Anatomy and Embryology—
Professor Musgrove.
Materia Medica—
Professor Marshall.

At University College, Dundee, full courses in medicine and in public health are given as follows:—

DUNDEE UNIVERSITY COLLEGE.

Professors and Lecturers.

Physics— Professor Kuenen.
Chemistry— Professor Walker.
Zoology— Professor D'Arcy W. Thompson, C.B.
Botany— Professor Geddes.
*Physiology—*Professor Waymouth Reid.
Anatomy— Principal Yule Mackay.
Surgery, Systematic and Operative—
Professor MacEwan.
Surgery, Clinical—
Professor MacEwan.
Mr D. M. Greig.
Medicine, Systematic—
Professor Stalker.
Medicine, Clinical—
Professor Stalker.
Dr Mackie Whyte.
Materia Medica—
Professor Marshall.
Pathology— Professor Sutherland.
Midwifery and Diseases of Women—
Professor Kynoch.
Midwifery and Diseases of Women, Clinical—
Professor Kynoch.
Dr R. C. Buist.
Forensic Medicine—
C. Templeman, M.D., D.Sc., M.O.H.
Ophthalmology—
A. M'Gillivray, M.D.
Mental Diseases—
J. Rorie, M.D.

Diseases of Ear and Throat—
G. T. Guild, M.B.
Vaccination—
R. C. Buist, M.D.

Qualifications given by the Scottish Colleges

The Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons of Glasgow, conjointly confer the Triple Qualification (L.R.C.P.E., L.R.C.S.E., L.F.P.S.G.). Female candidates are admitted to the examinations for this qualification, the Regulations being the same for candidates of either sex.

PRELIMINARY EXAMINATION.—This examination must be passed before the Student commences professional study. It may be passed before any of the Boards recognised by the General Medical Council, and enumerated in the Regulations of the Colleges. The Educational Institute of Scotland conducts a qualifying Preliminary examination for medical students, in Edinburgh and Glasgow, on behalf of the Colleges. This examination embraces English, Latin, Mathematics, and either Greek, French, German, Italian, or other modern language. All the subjects must be passed at one time. Further particulars are obtainable from S. M. Murray, Esq., 40 Princes Street, Edinburgh, or from Hugh Dickie, Esq., LL.D., Secretary to the Board of Examiners, Henrietta Street, Girvan.

REGISTRATION.—This is essential; the Regulations have been already given.

PROFESSIONAL EDUCATION. — The curriculum must extend over five years. Graduates in Arts or Science of any recognised University who have spent a year in the study of Physics, Chemistry, and Biology, and have passed an examination in these subjects for the degrees in question, are exempted from the first year of study. The fifth year of study should be devoted to clinical work in one or more recognised Hospitals or Dispensaries, and to the study of special diseases; but the student may pass six months of the fifth year as a pupil to a registered practitioner deemed capable by the committee of management. For information regarding the payment of class fees by the Carnegie Trust, *vide* p. 313.

ORDER OF STUDY WHICH IS RECOMMENDED.

First Summer.— Physics and Elementary Biology.
First Winter.— Five months' course in Chemistry and Anatomy; three months' course in Practical Chemistry; Practical Anatomy.
Second Summer.—Practical Anatomy; Histology.
Second Winter.— Practical Anatomy; Physiology—Five months' course.
Third Summer.— Three months' course in Pathology, Materia Medica, and Practical Materia Medica; Surgical Hospital Practice.
Third Winter.— Six months' course in Surgery and Clinical Surgery; Attendance at Surgical Wards.
Fourth Summer.—Three months' course in Midwifery and Gynæcology, in Medical Jurisprudence and Public Health, and in Clinical Surgery; Hospital Practice.
Fourth Winter.— Six months' course in Medicine and Clinical Medicine; Hospital Practice.
Fifth Summer.— Three months at Clinical Medicine; Hospital; Insanity; Diseases of Children; Diseases of Eye.
Practical Midwifery—Personal attendance on twelve cases under the supervision of a medical practitioner, *or* three months' attendance at a Lying-in Hospital and personal attendance on six cases.
Fifth Winter.— Hospital Practice; Fevers; Dispensary; Vaccination; Skin Diseases; Ear and Throat Diseases.

PROFESSIONAL EXAMINATIONS.—Four of these are held during the curriculum. Each is held quarterly in Edinburgh and twice a year in Glasgow. Candidates may go up for all the subjects of the first Professional examination at once, or may enter for and pass in any division of subjects. A higher percentage of marks is required, however, from candidates entering for such divisions. Candidates are advised to enter for the entire examination; they must enter for *all* the subjects of the second, third, and final examinations.

First Examination.— Physics, Chemistry, and Elementary Biology. This should be passed before the beginning of the second winter session.

Second Examination.—Anatomy, Physiology, including Histology. This should be passed at the end of the second year of study.

Third Examination.— Pathology, Materia Medica, and Pharmacy. This should be taken at the end of the third year.

Final Examination.— Can only be taken at the end of the fifth year. The candidate must have attained the age of twenty-one.

It includes:—

1. Medicine, Therapeutics, Medical Anatomy, Clinical Medicine.
2. Surgery, Surgical Anatomy, Clinical Surgery, Diseases of the Eye.
3. Midwifery and Diseases of Women and New-born Children.
4. Medical Jurisprudence and Public Health.

Fees for Professional Examinations.

For each of the first three, £5; for the final, £15. The minimum total expense, inclusive of fees for classes and examinations, amounts to £115.

Diploma in Public Health of the Royal Colleges.

The Diploma is granted by the Triple Qualification Board.

1. Every candidate for examination must have held a registrable medical qualification for one year.

2. After obtaining such qualification he must have attended during six months a recognised Laboratory in which Chemistry, Bacteriology, and the Pathology of the Diseases of Animals transmissible to man are taught; and the certificate must show that the candidate has conducted analyses of air, water, sewage, and foods.

3. After obtaining a medical qualification he must during six months have been engaged in acquiring a practical knowledge of the duties of Public Health Administration, under the supervision of—

(*a*) In England or Wales, the Medical Officer of Health of a County or single sanitary District having a population of not less than 50,000, or a Medical Officer of Health devoting his whole time to Public Health work; or

(*b*) In Scotland or Ireland the Medical Officer of Health of a County or District or Districts with a population of not less than 30,000; or

(*c*) A Medical Officer of Health who is also a teacher in the Department of Public Health in a recognised medical school.

(*d*) A Sanitary Staff Officer of the Royal Army Medical Corps having charge of an Army Corps, District, or Command, recognised for the purpose by the General Medical Council.

4. After obtaining a medical qualification he must have attended for three months the practice of a Hospital for Infectious Diseases.

There are *Two Examinations*. The first includes—(*a*) Laboratory work, with Chemistry and Bacteriology; (*b*) Physics; (*c*) Meteorology.

The Second Examination embraces—(*a*) Report on premises visited; (*b*) Examination at Fever Hospital; (*c*) Examination at Public Abattoir; (*d*) Epidemiology and Endemiology; (*e*) Vital Statistics and Sanitary Law; (*f*) Practical Sanitation.

Each examination is held bi-annually, in October and May. The fee for each is £6, 6s.; for re-examination, £3, 3s. Fees and applications to be lodged with Mr JAMES ROBERTSON, 54 George Square, Edinburgh; or with Mr ALEX. DUNCAN, LL.D., 242 St Vincent Street, Glasgow.

MEMBERSHIP AND FELLOWSHIP OF THE ROYAL COLLEGE OF PHYSICIANS, EDINBURGH.

Every applicant for the *Membership* must possess a recognised qualification, and be not less than twenty-four years of age. He must pass an examination on Medicine and Therapeutics, on Clinical Medicine, and on some special Department of Medicine, such as Psychological Medicine, Pathology, Medical Jurisprudence, Public Health, Midwifery, Gynæcology, Neurology, Diseases of Children, Tropical Medicine, etc. The Membership is conferred by election.

The fee for the Membership is thirty-five guineas, except the applicant be a Licentiate of the College, when it is twenty guineas.

Members of not less than three years' standing may be raised by election to the *Fellowship*, the fee being thirty-eight guineas, exclusive of Stamp Duty of £25.

Fellowship of the Royal College of Surgeons, Edinburgh.

Every candidate must be twenty-five years of age, and must have been engaged for two years in the practice of his profession, after having obtained a recognised qualification in Surgery. The petition for examination must be signed by two Fellows—a proposer and seconder.

The candidate must pass an examination on Surgery, Surgical Anatomy, Operative and Clinical Surgery, and one optional subject, for example, Ophthalmology, Aural, Nasal, and Laryngeal Surgery, Cerebro-Spinal, Abdominal, Gynæcological, Orthopædic, Dental, Venereal and Genito-Urinary Surgery, Advanced Anatomy or Physiology, Surgical Pathology and Morbid Anatomy, Midwifery, Gynæcology, Medical Jurisprudence and Public Health.

The fees amount to £45. If the candidate be a Licentiate of the College the fee is £30. Further particulars may be obtained from Mr James Robertson, Clerk to the College, 54 George Square, Edinburgh.

Fellowship of the Faculty of Physicians and Surgeons of Glasgow.

Every candidate must have been qualified for two years, and be aged twenty-four. Admission to the Fellowship is by examination and subsequent election. The candidate is examined on either (*a*) Medicine (including Clinical Medicine, Medical Pathology, and Therapeutics), or (*b*) Surgery (including Clinical Surgery, Operative Surgery, Surgical Anatomy, and Surgical Pathology); and on one optional subject—Anatomy, Physiology, Pathology, Midwifery, Diseases of Women, Medical Jurisprudence, Ophthalmic Surgery, Aural, Laryngeal, and Nasal Surgery, Dental Surgery, State Medicine, Psychological Medicine, or Dermatology,

The fee is £30, except the candidate be a Licentiate of the Faculty, when it is £15.

Medical Education of Women in Edinburgh

MEDICAL COLLEGE FOR WOMEN, MINTO HOUSE.

This College is recognised by the University Court and the Triple Qualification Board as a Medical School, whose courses of instruction qualify for graduation in Medicine. The curriculum and class fees are the same as for male students proceeding to the University Degree or College Qualification respectively. Clinical tuition is provided in the Royal Infirmary.

The prospectus of the College, and any information regarding the medical education of women in Edinburgh, may be obtained from the Secretary, Medical College for Women, Minto House, Edinburgh, who will be glad to furnish lists of lodgings to intending students.

Post-Graduation Study

The different University Laboratories provide facilities for research work. In most cases no fees are charged, but those engaged in research work are expected to defray the expense of materials. The Laboratory of the Royal College of Physicians of Edinburgh is splendidly equipped for the carrying out of all branches of medical research. It is available for research work to Members and Fellows of the Royal Colleges of Edinburgh and to other applicants approved by the Council of the Royal College of Physicians. No fees are charged, and the ordinary reagents, etc., are provided. By arrangement with the Superintendent, workers may have the assistance of members of the Laboratory Staff. This year special post-graduate courses have been held, and will be repeated next year.

Edinburgh Post-Graduate Vacation Course

The Post-Graduate Course extends this year from Monday, 17th September, to Saturday, 6th October.

The fee for the Course is Six Guineas; any three series of demonstrations, lectures, or clinics may, however, be attended on payment of Three Guineas. Arrangements have been made whereby those attending the course may, if they wish, obtain accommodation and board in the University Hall.

The scope of the course is shown in the following table :—

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	
9—10.		Diseases of Ear, Nose, and Throat. (6 Cambridge Street.)	Pathology of Eye.		Diseases of Ear, Nose, and Throat. (6 Cambridge Street.)	Clinics at Leith Hospital, &c., as announced in Weekly Leaflet.	9—10.
10—11.	Diseases of Heart (during 2nd and 3rd weeks).	Neurology.	Urinary Surgery. (27 Nicolson Square.)	Diseases of Heart (during 2nd and 3rd weeks).	Neurology.		10—11.
11—12.	Diseases of Skin. — Surgical Out-patients.	Medical Clinic. — Surgical Clinic.	Diseases of Skin. — Gynecological Operations.	Medical Clinic. — Surgical Clinic.	Diseases of Skin. — Surgical Out-patients.		11—12.
12—1.	Diseases of Ear, Nose, and Throat. — Sick Children's Hospital.	Diseases of Eye.	Venereal Diseases. — Gynecological Operations.	Diseases of Ear, Nose, and Throat.	Diseases of Eye. — Sick Children's Hospital.		12—1.
1—2.							1—2.
2—3.	Bacteriology.	Demonstrations on Surgical Pathology.	Examination of the Urine. — Anæsthetics.	Demonstrations on Morbid Anatomy.	Bacteriology.		2—3.
3—4.	Bacteriology.	Diseases of Blood. (College of Surgeons.)		Diseases of Blood. (College of Surgeons.)	Bacteriology.		3—4.
4—5.	Modern Gastric Methods.	Diseases of Blood.		Diseases of Blood.	Modern Gastric Methods.		4—5.
5.	Ophthalmoscopy. (45 Lauriston Place.)	Special Lecture. (University.)	Ophthalmoscopy. (45 Lauriston Place.)	Special Lecture. (University.)			5.

Unless otherwise stated, all the Demonstrations and Lectures referred to in the Time Table will be held in the Royal Infirmary.

Those intending to take the course are requested to notify the Secretary, The Faculty Office, University New Buildings.

In addition to this course the classes throughout the year on bacteriology, diseases of the blood, diseases of the tropics, neurology, etc., are usually attended by a considerable number of graduates.

Glasgow Royal Infirmary Post-Graduate Classes, Autumn 1906

Opening Lecture.—Subject, "The Etiology of Plague," by Major George Lamb, M.D., I.M.S., on Tuesday, September 4, at 3.30 P.M. The Hon. the Lord Provost of Glasgow will preside.

The following are the details of courses: No. 1 will be given in the Ophthalmic Institution, 126 West Regent Street, Glasgow, the others in the Royal Infirmary, Glasgow.

1. *Demonstrations on Diseases and Injuries of the Eye—*
   (*a*) By A. Maitland Ramsay, M.D., Clinical Instruction at 1.45 P.M., daily during September, beginning 5th September.
   (*b*) Lectures at 8 P.M. on Tuesdays during September, first Lecture on Tuesday, 4th September.
   (*c*) Tutorial Instruction at 8 P.M. on Fridays during September.

2. *Surgical Diseases of the Kidneys and Bladder—*
   By David Newman, M.D., F.F.P.S.G. Demonstrations at 4.15 P.M. on Mondays and Fridays, September 7th, 10th, 14th, 17th, 21st, 24th, 28th; and Ward Visits at 9.30 A.M. on Wednesdays, September 5th, 12th, 19th, 26th.

3. *Clinical Medicine—*
   (*a*) By J. Lindsay Steven, M.D., at 9.15 A.M. on Tuesdays and Fridays, September 14th, 18th, 21st, 25th, and 28th.
   (*b*) By T. K. Monro, M.A., M.D., at 4.30 P.M., on Tuesdays and Fridays, October 2nd, 5th, 9th, and 12th.

4. *Clinical Surgery—*
   (*a*) By John Barlow, F.R.C.S., at 4.30 P.M. on Thursdays, September 6th, 13th, 20th, and 27th.
   (*b*) By Mr Rutherfurd, at 9 A.M., on Tuesdays, September 4th, 11th, and 18th.
   (*c*) By A. N. M'Gregor, M.D., F.F.P.S.G., at 3 P.M. on Tuesdays and Fridays, September 18th, 21st, 25th, and 28th.

5. *Diseases of the Ear—*
   By J. Kerr Love, M.D., at 4 P.M. on Tuesdays, September 11th, 18th, and 25th, and 12 noon on Thursdays, September 13th, 20th, and 27th.

6. *Diseases of Throat and Nose*—
   By Robert Fullerton, M.D., at 10 A.M. on Tuesdays and Fridays in September, beginning September 7th.
7. *Hæmatology*—
   By Walter K. Hunter, M.D., D.Sc., at 4 P.M. on Wednesdays, September 5th, 12th, 19th, 26th, and October 3rd.

The Opening Lecture is free.

The fee for attendance at each of the other above Courses is £1, 1s.; for any three of them, £2, 2s.

8. *Gynæcology*—
   By G. Balfour Marshall, M.D., at 10 A.M. on Tuesdays, Thursdays, and Saturdays. First Course in September. Second Course in October. Fee for each Course, £2, 2s.
9. *Practical Pathology*—
   By Charles Workman, M.D., at 11 A.M. Five days a week from September 17th to 28th. Fee, £2, 2s.
10. *Bacteriology*—
    By David M'Crorie, L.R.C.P., etc., at 9 A.M. Five days a week during October, November, and December. Fee, £3, 3s.

Those desirous of attending any of the classes are requested to communicate with Dr Thom, superintendent, from whom a syllabus may be obtained.

THE ROYAL NAVY MEDICAL SERVICE

A CANDIDATE must be between 21 and 28 years of age. He must declare: (1) his age, and date and place of birth; (2) that he is of pure European descent, the son either of natural born British subjects or of parents naturalised in the United Kingdom; (3) that he labours under no mental or constitutional weakness; (4) that he is ready to engage for general service at home or abroad; (5) that he is registered under the Medical Acts as duly qualified professionally, and what diplomas, etc., he holds. Copies of the Regulations for the entry of candidates for commissions will be furnished on application to the Medical Director-General, Admiralty, 18 Victoria Street, London, S.W.

The entrance examination consists of two parts. Part I.—*Compulsory* (*a*) Medicine (including Materia Medica, Thera-

peutics, and Hygiene), 1200 marks; (*b*) Surgery and Surgical Anatomy, 1200 marks. A competent knowledge of Operative Surgery is essential. Part II.—*Voluntary*—consisting of two divisions: (*a*) French and German (300 marks each); (*b*) Natural Sciences—not more than two of the following subjects—Zoology, Botany, Chemistry, Physiology, Geology, and Physical Geography (300 marks each).

Successful candidates, immediately after passing this examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in Naval Hygiene, the diseases of warm climates, etc., at Haslar Hospital.

Full pay (*yearly*).—Surgeon (on entry), £255, 10s.; after four years' full-pay service, £310, 5s.; after eight years' full-pay service, or on promotion to Staff-surgeon, £365; after twelve years' service, £438; Fleet-surgeons (on promotion), £492, 15s.; after four years' full-pay service in that rank, £547, 10s.; after eight years' full-pay service, £602, 5s.; after twelve years' service, £657; Deputy Inspector-General, £766, 10s.; Inspector-General, £1300.

Allowances.—The senior medical officer of ships bearing the flag of flag officers commanding foreign stations and the Channel receives an allowance of 5s. a day. An allowance of 2s. 6d. a day may be granted to the senior medical officer of ships bearing the flag of flag officers not commanding stations or fleets and to ships flying the broad pennant of commodores. Medical officers conducting the course of instruction at Haslar Hospital receive the following allowances:—The two senior officers employed on this duty, £150 a year each; the junior officer assisting, £50 a year; the junior officer instructing the sick berth staff, £50 a year. The following charge allowances may be granted to medical officers in charge of hospital ships: if above the rank of Fleet-surgeons, 5s. a day; if of the rank of Fleet-surgeon or junior, 3s. 6d. a day. Hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and lights, are as follows: Deputy Inspector-Generals, at home, £67; abroad, £112; Fleet or Staff-surgeons, at home, £53; abroad, £112; Surgeons, at home, £39; abroad, £108.

Half Pay (*per diem*).—Surgeons under two years' full pay service, 6s.; after two years' full-pay service, 7s.; after four years' full-pay service, 8s.; after six years, 9s.; after eight years, 10s.; after ten years, 11s. Staff-surgeon on promotion, 12s.; after fourteen years, 13s.; after sixteen years, and on promotion to fleet-surgeon, 14s.; after eighteen years, 15s.; after twenty years, 17s.; after twenty-two years, 18s.; and after

twenty-four years, 20s. Deputy Inspector-General on promotion, 25s.; after two years' full-pay service in rank, 27s.; after four years, 29s. Inspector-General, 38s.

Every medical officer will be required to undergo a post-graduate course of three months' duration at a metropolitan hospital once in every eight years. While carrying out this course, he will be borne on a ship's book for full pay and will be granted lodging and provision allowances and travelling expenses. The fees for each course (not exceeding £25) will be paid by the Admiralty. The medical officer will be required to produce separate certificates of efficient attendance in (1) the medical and surgical practice of the hospital; (2) a course of operative surgery on the dead body; (3) a course of bacteriology; (4) a course of ophthalmic surgery, particular attention being paid to the diagnosis of errors of refraction; (5) a practical course of skiagraphy.

ROYAL ARMY MEDICAL CORPS

SINCE the recent introduction of improvements in the conditions of service, the Royal Army Medical Corps offer a much more attractive career to a young graduate than formerly. These improvements include the possibility of accelerated promotion by examination, the granting of study leave, the recognition of ability in special branches and increased pay.

The Journal of the Royal Army Medical Corps is an attractive monthly magazine, containing contributions from officers in the service.

The conditions of service are as follows:—

A candidate for a commission must be 21 years of age, and not over 28 years of age at the date of commencement of the entrance examination. He must possess a registrable qualification to practise. Regulations, forms of application, and declaration may be obtained on application to the Director-General, Army Medical Service, 68 Victoria Street, London, S.W. The Dean of the candidate's medical school will be requested to render a confidential report as to the candidate's character, conduct, professional ability and fitness, and to this report special importance will be attached. The candidate may subsequently be allowed to compete for a commission, having been previously examined as to physical fitness by a Medical Board.

The *Entrance Examination* (held twice a year, usually in January and July) is of a clinical and practical character, partly

written, and partly oral, marks being alloted under the following scheme:—

MEDICINE (written).	Maximum Marks.
A. Examination and report upon a medical case in the wards of a hospital	125
B. Commentary upon a case in medicine . .	125
MEDICINE (oral).	
A. Clinical cases; clinical pathology . . .	75
B. Morbid anatomy and morbid histology . .	75
SURGERY (written).	
A. Examination and report upon a surgical case in the wards of a hospital	125
B. Commentary upon a case in surgery . . .	125
SURGERY (oral).	
A. Clinical cases, including diseases of the eye; surgical instruments and appliances . . .	75
B. Operative surgery and surgical anatomy . .	75
Total marks . .	800

Having gained a place in this entrance examination, the successful candidates will undergo two months' instruction in hygiene and bacteriology, after which they will be examined in these subjects. On completion of this course, lieutenants on probation will proceed to the Depot of the Royal Army Medical Corps at Aldershot for a three months' course of instruction in the technical duties of the Corps, and at the end of the course will be examined in the subjects taught.

EXAMINATIONS FOR PROMOTION.

Lieutenant before promotion to Captain (for Lieutenants appointed after March 31st, 1901). This examination may be taken at any time after completing eighteen months' service. The subjects of the examination are: (1) regimental duties; (2) drill; (3) military law; (4) duties and accounts connected with military hospitals and their supplies; (5) other duties of executive medical officers.

Captains before promotion to Majors (for Captains promoted to that rank after July 27th, 1895). This examination may be taken at any time after completing five years' service, after terminating a period of special study. The subjects of the examination are: medicine, including specific fevers, surgery, including skiagraphy, hygiene, bacteriology, and tropical diseases, and one special subject from the subjoined list, to

which additions may from time to time be made—bacteriology (including the preparation of antitoxins), dental surgery, dermatology, midwifery and gynæcology, advanced operative surgery, opthalmology, otology, including laryngology and rhinology, psychological medicine, State medicine.

Majors for promotion to Lieutenant-Colonel (for Majors promoted to that rank after March 31st, 1895). This examination may be taken at any time after three years in the rank of Major. The subjects of this examination are: (1) military law; (2) army medical organisation; (3) sanitation of towns, camps, transports, etc., epidemiology and the management of epidemics, (4) the laws and customs of war in relation to the sick and wounded; (5) one special subject, *e.g.* (*a*) medical history of important campaigns; (*b*) a general knowledge of the army medical services of other powers.

PAY.

At Headquarters.

	Inclusive of all allowances except field and travelling allowances. Yearly.
Director-General	£2000
Deputy Director-General	1500
Assistant Director-General	850
Deputy Assistant Director-General	750

At other Stations.

	Exclusive of allowances. Daily. £ s. d.
Surgeon-General	3 0 0
Colonel	2 0 0
Lieutenant-Colonel	1 10 0
„ „ specially selected for increased pay after at least 8 years' service abroad	1 15 0
Major	1 3 6
„ after 3 years' service as such	1 6 0
Captain	0 15 6
„ after 7 years' total full-pay service	0 17 0
„ „ 10 „ „ „ „	1 1 0
Lieutenant on probation and Lieutenant	0 14 0

Adjutant of the Royal Army Medical Corps (Volunteer)—the pay of his rank.

Additional Pay.

Officer not serving on the Headquarters Staff appointed a member of the Advisory Board	£150 a year.
Officer serving as Secretary of the Advisory Board and Nursing Staff	£100 a year.
Officer under the rank of Lieutenant-Colonel holding an appointment as Specialist	2s. 6d. daily.

Quarter-Master in charge of Medical Stores at Woolwich . . . . . 2s. 6d daily.

Charge Pay.

(*a*) Officer in charge of a general or other hospital, or of a division of a general hospital—

	Daily. s.	d.
If in charge of at least 50 beds . .	2	6
„ „ „ 100 „ . .	5	0
„ „ „ 200 „ . .	7	6
„ „ „ 300 „ . .	10	0
(*b*) Officer in command of the Depôt, Royal Army Medical Corps	5	0

Retired Pay.

	Yearly.
Director-General (after three years' service in the appointment, and 30 years' service) . .	£1125

	Daily. £	s.	d.
Surgeon-General	2	0	0
Colonel	1	15	0
Lieutenant-Colonel, or Surgeon-Lieutenant-Colonel of the Household Troops—			
After 20 years' service . . .	£1	0	0
„ 25 „ „ . . .	1	2	6
„ 30 „ „ . . .	1	5	0
Lieutenant-Colonel, after having been in receipt of the increased pay (5s. a day) for 3 years; or Brigade-Surgeon-Lieutenant-Colonel of the Household Troops—			
Under 30 years' service . . .	1	7	6
After 30 „ „ . . .	1	10	0
Major, or Surgeon-Major of the Household Troops—			
After 20 years' service . . .	1	0	0
After 25 years' service, if his service reckoning for promotion is insufficient to qualify him for promotion to the rank of Lieutenant-Colonel . .	1	2	6

	Gratuity.
Major or Captain—	
After 5 years' service in the rank of Captain	£1000
After 10 years' service, if the officer was commissioned before the date of the Warrant	1250
After 3 years' service in the rank of Major	1800
After 6 years' service in the rank of Major	2500

Surgeon-Lieutenant-Colonel or Surgeon-Major of the Household Troops—

After 15 years' service . . .	1800
„ 18 „ „ . . .	2500

Retirement shall be compulsory at the following ages :—

Surgeon-General	60
Colonel, promoted to the rank on or after the date of the Warrant . .	57
Colonel, promoted to the rank before the date of the Warrant . . .	60
Other Officers	55

INDIAN MEDICAL SERVICE

CANDIDATES must be natural born subjects of His Majesty, of European or East Indian descent, between 21 and 28 years of age at the date of the examination, of sound bodily health, and in the opinion of the Secretary of State for India in Council, in all respects suitable to hold commissions in the Indian Medical Service. The candidate must show proof of age, a recommendation to the effect that he is of regular and steady habits, a certificate of moral character, certificate of registration under the Medical Acts, a certificate of having attended a course of instruction for not less than three months at an ophthalmic hospital, or the ophthalmic department of a general hospital.

The physical fitness of each candidate will be determined by a Board of Medical Officers.

On proving possession of the foregoing qualifications, the candidate will be examined in the following subjects :

	Maximum Marks obtainable.
1. Medicine, including Therapeutics . .	1200
2. Surgery, including Diseases of the Eye .	1200
3. Applied Anatomy and Physiology .	600
4. Pathology and Bacteriology. . .	900
5. Midwifery and Diseases of Women and Children	600
6. Chemistry, Pharmacy, and *either* Botany *or* Zoology	600

After passing this examination, the successful candidate will be required to attend one entire course of practical instruction of not less than four months' duration at the Army Medical School and elsewhere in (1) Hygiene; (2) Clinical and Military Medicine; (3) Clinical and Military Surgery; (4) Pathology of

diseases and injuries incidental to military service. During the period of instruction each candidate will receive an allowance of 14s. per diem, with quarters, or with the usual allowances of a subaltern in lieu thereof. At the conclusion of the course, candidates will be required to pass an examination in the subjects taught during the course.

Pay and Promotion.

The rate of pay drawn by a Lieutenant previous to arrival in India is 14s. a day, but a Lieutenant who has been permitted by the Secretary of State to hold a hospital appointment will receive no pay while holding it.

A Lieutenant may be promoted to Captain on completion of three years' full pay service from date of first commission; but after completing eighteen months' service, and before promotion to the rank of Captain, he will be required to pass an examination in military law and military medical organisation, the result of which may affect his promotion.

A Captain is promoted to Major on completion of twelve years' full-pay service.

A Major is promoted to Lieutenant-Colonel on completion of twenty years' full-pay service.

All promotions from the rank of Lieutenant-Colonel to that of Colonel, and from the rank of Colonel to that of Surgeon-General are given by selection for ability and merit.

Pay.

The following are the monthly rates of Indian pay drawn by Officers of the Indian Medical Service from the date of their arrival in India :—

Rank.	Unemployed Pay.	Grade Pay.	Staff Pay.	In Officiating Medical Charge of a Regiment.	In Permanent Medical Charge of a Regiment.
	Rs.	Rs.	Rs.	Rs.	Rs.
Lieutenant . . .	420	350	150	425	500
Captain	475	400	150	425	550
„ after 5 years' service .	475	450	150	545	600
„ after 7 years' service .	—	500	150	575	650
„ after 10 years' service .	—	550	150	625	700
Major	—	650	150	725	800
„ after 15 years' service .	—	750	150	825	900
Lieutenant-Colonel	—	900	350	1075	1250
„ „ after 25 years' service	—	900	400	1100	1300
Lieutenant-Colonel specially selected for increased pay .	—	1000	400	1200	1400

The principal administrative appointments are held by Colonels and Surgeon-Generals on the following consolidated salaries:—

Colonels, from Rs. 1800 to Rs. 2250 per mensem.				
Surgeon-General	2	@	Rs. 2200	„
„	2	@	Rs. 2500	„
„	1	@	Rs. 3000	„

Specialist pay at the rate of Rs. 60 a month is granted to officers below the rank of Lieutenant-Colonel who may be appointed to certain posts.

The salaries of other substantiative medical appointments in the Civil and Military Departments are consolidated, and vary from Rs. 400 to Rs. 1800 per mensem.

Qualified Officers of the Medical Service are also eligible for appointments in the Assay Department. The salaries of these appointments are from Rs. 600 to Rs. 2250 per mensem.

Officers are required to perform two years' regimental duty in India before they can be considered eligible for civil employment.

Except in the administrative grades, and in certain special appointments, medical officers are not debarred from taking private practice. No officer, however employed, can receive any staff allowance unless he has passed the examination in Hindustani known as the "Lower standard."

Retiring Pensions and Half-Pay

Officers of the Indian Medical Service may retire on the following scale of pension:—

	Per Annum.
After 30 years' service for pension . .	£700 —
„ 25 „ „ „ . . .	500
„ 20 „ „ „ . . .	400
„ 17 „ „ „ . . .	300

All officers of the rank of Lieutenant-Colonel and Major are placed on the Retired List when they have attained the age of 55 years, and all Surgeon-Generals and Colonels when they have attained the age of 60 years.

Officers placed on temporary or permanent half-pay are granted the British rate of half-pay of their military rank as under:—

Rank.	Rates of Half-pay. Per diem.		Per annum.		
	s.	*d.*	£	*s.*	*d.*
Lieutenant-Colonel . .	11	0	200	15	0
Major	9	6	173	7	6
Captain	7	0	127	15	0
Lieutenant . . .	3	0	54	15	0

MEDICAL APPOINTMENTS IN THE COLONIES

APPLICANTS for medical appointments in British Guiana, Jamaica, Trinidad, and Tobago, Windward Islands, Leeward Islands, British Honduras, Fiji, Ceylon, Straits Settlements, Sierra Leone, Gambia, Gold Coast, Lagos, Northern and Southern Nigeria, Malay States, Hong Kong, Mauritius, Scychelles, Gibraltar, Cyprus, St Helena and the Falkland Islands, must be between 23 and 30 years of age, must be doubly qualified, and preference will be shown towards those who have held resident hospital appointments. Applications for medical appointments should be sent to the Assistant Private Secretary, Colonial Office.

Information regarding medical appointments in Cape Colony and Natal can be obtained on application to the Agent-General to the Cape, 100 Victoria Street, London, S.W., and the Agent-General for Natal, 26 Victoria Street, London, S.W.

Medical appointments in Rhodesia are made by the British South Africa Company, 2 London Wall Buildings, E.C.; those in the Transvaal and Orange River Colonies are made on the recommendation of the Governors of these Colonies.

THE TEACHING OF MEDICINE

THE educational number has hitherto consisted of a detailed account of the regulations referring to the course of study required of the medical student, along with some information as to possible openings when he had acquired his degree.

The other side of the matter, viz., whether these regulations, etc., were the best attainable has only been dealt with occasionally, and the subject of Medical Education is at present so much in evidence that it seemed well to endeavour to get a more general expression of views.

Accordingly, prior to their departure for Toronto, the Editors issued a letter to a number of teachers and others asking them to write articles, long or short, on how they thought their own subjects ought to be taught: what if they had an absolutely free hand would be their ideal? The articles to be anonymous.

The responses to the letter, which came from all the Scottish Schools, were so numerous that we are reluctantly

compelled to hold many of them over for next month, and they give evidence, we think, of a widespread feeling that good as is the education in our Scottish Universities, it is not so good as to be incapable of improvement, and we are not without hope that the authorities will read the various communications with interest, and possibly with benefit.

GENERAL

THE problem of the education of the medical student can only be solved by a consideration of the answer to the question, "What should the general practitioner know?" For, as truly as the "race lives in the cottage," so does the medical tendance of the nation lie chiefly in the hands of the general practitioner.

The advanced training of the specialist does not here present concern, as that is necessarily always a question for the individual.

The more I have seen of medical students, the more I have seen of medical men, and the longer my experience of professional and social life, the more strongly am I impressed with the clamant necessity for an adequate general education for the medical student. Let him have this, and, as opportunities offer, all else will be added to him.

The professional and legitimate general influence of the medical man would be infinitely increased were his intellectual outlook wider. Not only so, but the intellectual gymnastic of a more liberal general education would enable him to grasp the principles of his art with greater address, ease, and precision.

At a time when so many call for the addition of other subjects to an already full curriculum, and more prolonged technical study, it is necessary to insist that there is another point of view.

It matters little whether the preliminary education be classical, so-called modern or scientific, so it be thorough and wide.

This being taken for granted, there falls to be considered the strictly technical curriculum.

The preliminary scientific subjects are essential, but here again it is more important that the student grasp the conception of the scientific method, than that he should remember the dentition of the hedgehog or the subdivisions of the cryptograms. He must be well grounded in chemistry, biology, anatomy, physiology, and pathology. He must not only attend lectures, but do as much practical work with his own hands as is possible. He must have a general knowledge of Public Health and Medical Jurisprudence, and have the fullest opportunities for prosecuting the theoretical and practical study of medicine, surgery, and

obstetrics. It may be doubted if long courses of systematic lectures are productive of the greatest good. Selective courses, with the guidance for reading of an exhaustive syllabus, probably would be more satisfactory, more educative to the average student, more stimulating to the brilliant man.

The student in the wards should be able to deal with the special methods of chemical, physical, and microscopical aids to the diagnosis and investigation of disease. Our infirmaries should not be observed with the conviction of our churches that buildings are a substitute for grace. In every ward students should be encouraged to make regular use of all diagnostic instruments, and no plea of economy can excuse a great infirmary for refusing oil immersion lenses to its wards. A study of the Moseley Report on Medical Education in American Universities would give matter for consideration to our governing bodies.

The student cannot hope to become an all-round specialist, but at the least he can be made familiar with the use of the ordinary instruments of examination—the ophthalmoscope, the laryngoscope, the aural, nasal, and other specula, the hæmocytometer, etc. As a family medical attendant he is not required to perform all operations, but he must know when he has come to the end of his tether.

Some provision should be made, perhaps in a social way, by the professors and teachers of the school, to stimulate an interest in the ancillary relations of medicine to the other sciences, in the history of medicine, and the relation of medicine to the social (and political) problems of the time.

All turns on brains, education, and character. The material is good in the rough ; it requires more careful early nurture, and the problem of special professional training will have been simplified. The position and authority of the medical profession do not depend alone on the immense importance of its duties to the commonwealth, but upon the intellectual and moral capacity of the individual to discharge them.

ANATOMY

ANATOMY remains to-day as always and for everyone, the basis of the whole superstructure of medical education, yet during recent years voices of murmur or even protest are heard regarding the methods of teaching and the time devoted to the subject. The comments come from two classes of persons ; 1st, one hears the practical man complain of the ignorance of students of facts

actually of service in the arts of surgery and medicine; and 2nd, one hears the man interested in the younger medical sciences, which every year become more exacting in their demands, question seriously whether anatomy is entitled to the time it absorbs in the curriculum.

That the curriculum, in spite of the fifth year of study, is congested, most will admit, though, perhaps, the cause lies as much in the want of co-ordination than in anything else, and since physics was added as a compulsory subject in the first professional, anatomy, at least in some teaching centres, has suffered in a serious degree because the old first winter session in which a good foundation of elementary anatomy was laid, is now exclusively taken up with the preliminary sciences.

Thus a body of opinion has developed which regards a course of scientific anatomy as fulfilling all the requirements of strictly medical education in the way of zoology, and which would remove a course of general natural history from the list of compulsory subjects.

That the medical student requires a detailed knowledge of genera and species is an idea long given up, but there is no doubt that a course of zoology which deals with the general principles of animal morphology, if well illustrated by practical work, is an essential introduction to the study of human anatomy. What is wanted is not so much the exclusion of such a course in the interests of anatomy, but rather a more complete co-ordination and franker co-operation between the departments.

The complaint of the practical man against anatomical teaching and learning is no doubt based on actual experience, but it is not wholly just either to teacher or student. It is undeniable that anatomical facts, unless related in some way, have no very permanent place in most men's memories. It is one thing to remember a point as a piece of detached information, but quite another to retain it when related to some procedure of practical utility, or when it becomes a factor in the explanation of some abnormal condition.

The only way to obtain a reasonably permanent knowledge of anatomical detail is to visualise the relations of parts, but there is a limit to the degree to which this can be done by the student, and it may be conceded that perhaps he allows himself, or is allowed, to lose sight, in the details, of the broader facts as they present themselves to one who is applying anatomical data with a conscious aim. It may therefore be conceded to the practical critic that the more men are encouraged in the dissecting room to consider the practical aspects of their works, and the more their attention is focussed on what is of special value

from this point of view, the better. That all anatomical facts are not of equal importance, is, of course, admitted, but there seems room for a considerably freer interpretation of what a medical student must know in the way of detail than anatomical text-books afford any warrant for. In this matter only the individual judgment can decide in the light of experience, and it is sometimes urged as one of the disadvantages of specialisation in anatomy that a sound balance is not always attained. That there is a reasonable element in such criticism may be conceded, but, on the other hand, it must be remembered that anatomy taught too exclusively from this point of view is just as apt to emphazise points which, without their application, are meaningless and profitless detail at that stage.

While, therefore, it may be admitted that as much ought to be done as is possible in the way of selection and presentation of anatomical facts for serviceable ends, the real object of teacher and student should be to give, and get at, the general principles of the science without hampering the memory too much with such detail as has neither a practical application nor a place in a reasoned morphological system.

It is here that modern methods may be expected to improve the teaching of anatomy. The advances of the science in the direction of morphology and embryology are giving the subject continually increasing interest, and the principles of structure, and the meaning of the arrangement of parts, may be presented in such a way that much of what was at the best memory of actual dissections, or at worst brain works from the books, became part of a reasoned synthesis.

The day when the ideal presentment of anatomical fact was a complete and sometimes pedantic description of the detail of adult structures is passing, and the laws of morphology and development find continually wider expression in anatomical teaching. Professor Meriot, in a recent address on "Genetic Interpretations in the Domain of Anatomy," no doubt points out, and rather caustically, the defects of the text-books in this regard, and it must be admitted that a "genetic" text-book of anatomy has yet to be written.

While, therefore, every attention must be given to practical utility, it must be remembered by critics of scientific anatomy that "genetic interpretations" are of importance not for themselves only, but for the actual memorising of even the commonest details, and the teaching of morphology and development is not an end merely but a means.

There is much to be said for the German system, which includes histology in the department of anatomy. The methods of histology are anatomical methods, and the facts are anatomi-

cal facts. It would save much overlapping were the anatomist responsible for the presentation of all data regarding the structure of the body. The minute structure of organs is best learned with the gross structure, and as the present system often results in the student learning the microscopic anatomy before he is familiar with the gross anatomy and *vice versa,* repetition is unavoidable. Here even under the present system there is not always, at any rate, that co-ordination and co-operation between departments which would make for saving of time and effort.

That histology will be transferred to the anatomical department at some future time may be hoped in the interest of concentration and condensation of the curriculum.

PHYSIOLOGY

WHEN suddenly asked by the Editor to express my views as to how I would teach Physiology were all regulations and restrictions removed, I confess that I felt like some prisoner released from a long captivity, and hardly knowing how to make use of his freedom. We have laboured in chains for so many long years that the chains have ceased to gall and are accepted as inevitable.

But, as I mentally shook myself free of all limitations of curriculum and examinations, I found that it was only to be faced by a more serious restriction—"Why should the person taught desire to know Physiology?" Well, as the *Scottish Medical and Surgical Journal* is *medical*, I concluded that the Editor, while offering me an apparent freedom, had really merely somewhat released my chains, and had left imposed upon me the condition that I should teach my subject to medical students.

Naturally, my first business was to answer the question —"Why should medical students take up the study of Physiology?"—a question very easily answered, since it is obvious that they must know the action of the body in health, before proceeding to study it in the diseased condition. But not only must they master the action of the body in health, they must further be taught how to investigate the action of each part, so that they may be able to find out whether its action is normal or abnormal.

The knowledge must be real, actual knowledge, capable of application to the practical work of medicine. Mere book knowledge is of no use.

How, then, should I give him this actual knowledge, had I the opportunity of arranging my instruction as I liked best?

First, I should say to myself—"The student has to master the science and art of medicine, surgery, and the allied arts, in the course of five years, between the ages of, say, seventeen and twenty-two. How much of this short time have I a right to demand? In how short a time can I give him the knowledge of physiology which is requisite for the further study of his profession?"

I should ask for a minimum of two hours a day for a session of five months, and an hour a day for another five months—say 200 hours.

I should have no formal separation between the practical work and lectures, but I should, at every stage, make practical work precede lectures.

If Histology is regarded as a part of Physiology, I should let the student start with a three months' course of study of the ordinary methods of examining and preparing the tissues, and with a careful study of the structure of these tissues, using the course largely as a means of educating his powers of accurate and systematic observation and description, and forbidding the use of descriptive text-books.

If Histology is not regarded as part of the physiologist's domain, but if it is properly taught before the student reaches his physiological studies, I should then start him at once with the investigation of some very prominent physiological phenomenon—such as the contraction of his own biceps in flexion of the arm. I should make him analyse this for himself and work out the kind of lever action involved, and I should make him, by measurement and calculation, work out the extent of shortening of the muscle for any given degree of movement of the hand.

From this I should pass to the question of how a muscle is made to contract, by giving him a frog with the brain destroyed, and making him cut one sciatic nerve and then

produce reflex movements. I should thus let him learn that muscles are made to contract by nerves.

I should then let him clinch this conclusion by stimulating the cut nerve, and I should also make him stimulate the muscle directly, and then raise the question, "Does this mean that the muscle is directly stimulated, or is it simply stimulated through the nerves that are in the muscle?" This would lead to the curare experiment on the pithed frog. From this one might pass to the practical study of the course of muscular contraction and the influence of one or two factors upon it.

So far I should allow no reading of text-books or attendance on lectures, but each experiment and the conclusion drawn from it would have to be carefully written in the student's note-book. Above everything, I should insist that such experimental work should not degenerate, as it has degenerated in most schools, into a mere learning a series of tricks from a text-book—the main object being to perform each trick with neatness and celerity, but without any comprehension of its object and lessons.

After the student had thus been practically introduced to the solution of the problems of Physiology, I should allow him to attend lectures and read text-books, by which the knowledge gained by his own experience would be expanded, while being still kept strictly related to the facts he had thus practically learned.

In fact, my great aim would be *to make lectures and text-books supplement practical teaching, and not practical teaching supplement lectures.*

Similarly with the chemical problems of Physiology, I should begin by practical study. For instance, starting with a common food, like starch, I should allow the student to hydrolyse it into sugar, and then, by burning, split it into carbon dioxide and water. After this might come a lecture on the carbohydrates, and then further practical instruction in the tests for the various members of the group. The fats and proteids would be treated in the same way. Before the student attended a single lecture on the blood, he would have studied its histology and chemistry practically; while the phenomena of circulation, respiration, digestion, and excretion would be dealt with in a similar manner. Even in the study of the physiology of the

central nervous system, practical histology, practical study of what degeneration is, and simple experiments on reflex action and cerebral action would precede all formal teaching.

A long experience as a teacher, tied down by the regulations of the school to which I have belonged, and a very wide experience as an examiner, have convinced me that what the student does not at present get is *real* knowledge. Everything is learned second-hand, through the mind of his teacher, and the powers of honest observation, of considering and weighing evidence, and of coming to a definite conclusion are not cultivated. In fact the present system is not scientific, and the student goes from the study of anatomy and physiology to the study of medicine with a mind untrained to resist the empirical methods of diagnosis and treatment which too often satisfy his clinical teachers. The result is that, after his five years of study, he is turned out incapable of advancing the science of medicine—content to work in the old lines, and well satisfied if he can make the congeries of symptoms which he observes in his patient fit some disease of a high-sounding name which in itself is a confession of an ignorance of the pathology of the condition, and if he can satisfy the patient and the relatives by the administration of some remedy recommended by the famous Doctor So-and-so.

I am convinced that it is the business of those of us engaged in teaching the preliminary sciences to develop a real curiosity, to break down the respect for authority, to instil a love of actual facts, and to train the powers of observation and investigation in the student, so that, as a practitioner of the coming generation, he may take his part in making medicine an art based upon science.

ON THE TEACHING OF CLINICAL SURGERY

CLINICAL SURGERY cannot be taught; it must be learnt. The only men about a school like ours who in reality have a chance of becoming *au fait* at the subject are the house-surgeons. They alone are brought into sufficiently intimate and constant contact with the patients for such an end. Unfortunately every student

cannot hold a house-surgeoncy; but it should be realised that those men who after graduation go into practice without having held such a post, bring little credit, as far as surgical work is concerned, either to themselves or their Alma Mater.

This is perhaps a hard saying; but such a state of matters is the necessary result of the conditions which exist in a school like ours, where an enormous number of students have to be taught from a limited number of patients. That an unusual amount of time and trouble is taken in the Edinburgh school to teach men their Clinical Surgery cannot be denied. This has been a tradition of the school for many years past. In what other British school, for instance, do the full surgeons spend two hours or more every day in the week (except Saturday and Sunday) in teaching Clinical Surgery? Certainly not in that part of the world which we have to thank for our most severe critics. As a matter of fact, the Edinburgh student is very well taught as regards the groundwork of his Clinical Surgery, but he lacks as a general rule the manipulative dexterity and familiarity with the technical details of Surgery which can be alone acquired by close personal contact with a large number of patients, and which, necessary though they be, are sometimes too apt to be mistaken for the be-all and end-all of surgical education. It is a matter of common knowledge, however, that when an Edinburgh graduate has held such a post as that of house-surgeon, and has thus added technical finish to his previous thorough surgical grounding, he compares very favourably indeed with men from any other British school.

The Edinburgh teacher of Clinical Surgery has certain difficulties to contend with. As has already been said, the large proportion of students to patients makes personal contact and manipulative practice impossible for the majority of the men, except in a modified degree. Small classes, though desirable, are impossible; the teaching must be carried out in classes of fifty or sixty or (more), and Clinical Surgery could doubtless be best taught in classes of one.

The advantages of a large medical school such as ours, with its necessarily crowded classes, are in many ways overwhelming, *e.g.* in the direction of enthusiasm on the part of teacher and student; but it must be admitted that there are some drawbacks, of which the above clinical difficulty seems to be the chief. A

worse impediment to the teaching of Clinical Surgery in Edinburgh, and one for which there is no excuse, is the absurd plan of sending men to Clinical Surgery lectures at the beginning of their second year. They do not at that time know a word of pathology, physiology, nor systematic surgery, and have only just begun their anatomy. They consequently are almost completely ignorant of those subjects the application of which *ad hominem* constitutes Clinical Surgery teaching. An effort is at last being made to rectify this glaring defect, and therefore no more need be said on the subject at present.

In any attempt to discuss improvements in the teaching of Clinical Surgery, it may be better to suggest modifications of our present plan with its inherent difficulties and limitations, rather than draw a fancy picture of an ideal which is entirely out of our reach. The difficulties and limitations referred to are—(1) the large number of students to be taught; (2) the fact that senior and junior students come at the same hour to the wards for instruction; (3) the limited "hospital hour," viz. 11 A.M. to 1 P.M.; (4) the comparatively small number of patients to be taught from; and (5) the present arrangement of the Out-patient Department.

1 and 2. With a large class, say of fifty to eighty students, the old-fashioned plan of "going round the wards" is quite hopeless. If such a number of men walk about from one bed to another one cannot manage them. Those on the outside cannot see, and begin to talk, etc. The only plan is to seat them on forms and bring the beds into their midst. In this way twenty or thirty men at any rate can see and hear well enough, and a certain percentage can handle the cases. In order to reduce the class of fifty or sixty to half its size, and at the same time to obviate the serious drawback of trying to teach Seniors and Juniors at the same time, a much greater effort should be made than heretofore to divide the class into separate cliniques for Seniors and Juniors. This could easily be done with the help of the assistant surgeons, who, to judge by one's own experience, should be glad to thus gain practice in teaching and be brought into close contact with the students. The full surgeon and assistant surgeon should thus every day be teaching separate classes of senior and junior students at the same hour; and, even in the case of the "lectures" in the theatre, this plan might

be followed with advantage. These formal lectures in the theatre might also to some extent be modified, the teaching being made more practical and less of a systematic prelection.

3. The fact that all the work in the surgical wards which is done in the presence of the students, including operations, lectures, and cliniques, has to be carried out between 11 and 1 o'clock, makes it imperative that this sufficiently short time should not be encroached upon, as has been too often the case in the past, by other subjects, notably by physiology. The shortness of this "hospital hour" and the large size of the classes makes it difficult for the surgeon and the student to do as much of the *dressing* of operation cases in the wards as is desirable; but if the proposed division of the class into Seniors and Juniors were carried out, more of this important work might be done in "hospital hour." And this arrangement would have a good effect if it prevented the present highly objectionable plan of the students coming up to hospital at night to dress their cases. This disturbs the patients when they ought to be getting to sleep; it often keeps a patient uncomfortable all day from not having been dressed in the morning, as he should have been; it is hard on the nurses; and it takes the student out at night, and thus breaks up his evening for work.

4 and 5. The material that each surgeon has for the purpose of teaching is usually too small; and if the above plan of division of classes into Seniors and Juniors were to be followed, the difficulty would be still more marked. This is to some extent due to the present arrangement of the Out-patient Department, which, whatever its advantages in other ways may be, has certainly deprived the surgeon of a good deal of useful teaching material, and has at the same time done little to utilise the material thus absorbed for the benefit of the general body of students. A reversion should now be made in the Out-patient Department to the old plan, where the assistant surgeon attached to each clinique was responsible for the out-patients on his chief's waiting day, and could use them for the benefit of all the junior students attached to the clinique, and as many others as chose to come, or who could be accommodated. There would be no difficulty in doing this, with the best results as regards the patients, now that there is (as, of course, there always should have been) a separate and sufficient staff of house-surgeons,

nurses, etc., attached to the Out-patient Department. At present only a very small minority of the students benefit by the Out-patient teaching, and these are for the most part Seniors. The Out-patient Department is the proper place for the Juniors to learn the rudiments before they come up to the wards to attend cliniques and lectures on more advanced cases. If the Seniors had been through such a course in their early years of study, they would not require it in their last year.

With regard to the paucity of material in each clinique, there does not appear to be any sufficient reason why there should not be a certain interchange of patients for teaching purposes between the various surgeons. For example, the two University surgeons might work together, the two senior, and the two junior extra-mural surgeons. This would add very largely to the available material, and, if it were done with judgment and care, should give rise to no insuperable difficulties. There would, of course, be only a certain proportion of cases suitable for such purposes, and the students would probably not see such a case from another ward operated upon or treated to its termination; but for all that, the material thus gained would often be of the greatest use for purposes of illustration.

In addition to the teaching done by the surgeon and assistant surgeon, there is the tutorial class, at which the Seniors and Juniors are taught separately the details of ward work—instruments, etc.—and parts of the clinical tutor's work should be to demonstrate to the class the macroscopic and microscopic appearances of the specimens removed from patients operated upon in the clinique.

THE TEACHING OF SURGERY.

IN considering how Surgery ought best to be taught the first question which arises is at what period of the curriculum is the medical student best fitted to begin his surgical work? This question is one which is by no means easy to answer in a satisfactory manner. Thus we find of the three large Scottish Universities, in one the student is advised to take Surgery in his second winter, and at the same time to attend Physiology and Practical Physiology, as well as Hospital and Clinical Surgery, the latter usually during the second half of the winter

session. He continues to work at Clinical Surgery during the following summer and winter sessions, and then, so far as his suggested course of study is concerned, he has presumably learned his Surgery. In a second University Physiology is advised to be taken in the second winter, Hospital and Clinical Surgery in the following summer and winter, and Surgery in the third winter.

In the third University the arrangement suggested is very much the same as that of the first mentioned, with the important addition of Clinical Surgery in the fifth summer and winter.

It will thus be seen that according to the present arrangements, the student is advised to begin his Surgery and Clinical Surgery at the same time, and in the case of one University he begins clinical work before he has had Surgery lectures. In all he has presumably passed his first professional, and in all he is working for his "second" when he begins his systematic and clinical work.

The rearrangement of the medical curriculum has, we understand, been under discussion for a considerable time. We have reason to believe that important improvements have been suggested, and we trust they ere long will be carried out.

We are strongly of the opinion that a medical student should not be allowed to enter hospital—we have known a man who had taken out all his surgical classes, and was attending Midwifery, and still had to pass Chemistry in order to complete his "first"—until he had passed what may be called the preliminary scientific subjects. It would indeed be infinitely better if the student were not allowed to enter upon the study of medicine proper, by which we mean Anatomy, Physiology, etc., until he had passed the subjects now included in the first professional examination. An ideal arrangement would be that the student did not begin his surgical work until he had passed his examination in Anatomy and Physiology. In making this statement we are fully aware of the advantages of the student entering hospital as soon as possible. He has so much to get up that he is given to work only at those subjects embraced by the next examination he has to pass.

The teaching of Surgery embraces Systematic Surgery, Clinical Surgery, and Operative Surgery, and it is a matter of considerable moment to inquire how these may best be taught, and in what order.

Let us consider each of these subjects by itself.

1. Systematic Surgery ought, in our opinion, to be taken before the student enters upon his clinical work. The teaching of systematic surgery raises the question, Is a student to

attend more than one course? At present, so far as our experience goes, lectures are taken twice—in the second and final year—by the large majority of men. A few take only one course, viz., in their final year. Those who take a course only in their second year are so few as to be a negligible quantity. This shows very conclusively that men who are going up for their final feel that they require to have another course of Surgery lectures.

We are aware that the student at present suffers from over-lecturing, which, in many instances, arises from overlapping. It is impossible to deal with the whole of Surgery adequately in a hundred lectures, and the disadvantage of lecturing to seniors and juniors in the same class is obvious. Medicine and surgery nowadays touch each other so closely that the student who is approaching his final ought to have had a course of Medicine when he attends Surgery.

Again, much time would be saved if Pathology had been taken out; this is, however, not possible, as it would delay far too long the commencement of clinical work.

We would recommend a junior course say of fifty lectures, preferably after the examination in Anatomy and Physiology has been passed.

Such a course would include General Surgery, as much surgical Pathology as would enable a student to understand the principles of normal technique, and fractures and dislocations. These lectures ought to be attended before the student begins clinical study, but he could with advantage attend the surgical out-patient department while they are going on.

If lectures are to be attended in the fifth year, the senior course ought to be taken then. It would include mainly, if not entirely regional Surgery, and probably fifty lectures would suffice. The scope of this course would, however, depend upon the manner in which Clinical Surgery is taught. All surgical courses ought to be made as practical as possible, and illustrated by demonstrations on Surgical Pathology.

The period at which Operative Surgery is taken will be considered subsequently.

2. *Clinical Surgery.*—We propose to briefly express our views on the teaching of Clinical Surgery before considering how it may best be carried out.

Clinical teaching, in our opinion, consists essentially in the contact of the student with the patient, and in its true sense can only be properly taught in the wards or out-patient department.

Clinical lectures to students on the back benches of a theatre, or ward clinique to sixty or more men, may satisfy

the requirements, so far as granting a certificate is concerned, but they are not clinical teaching, and are perhaps best described as systematic lectures on patients lying on a table or in bed. The student can see little or nothing, and cannot come in contact with the patient. Clinical lectures have their place, large cliniques may also serve as useful illustrations in some instances, but the teaching of Clinical Surgery in its true sense consists in taking students in small numbers from bedside to bedside, or having them to examine patients in the area of the out-patients' theatre. If the Clinical Surgery classes in any school be too large to permit of their being done by the clinical lecturer, then the class ought to be broken up into sections. It would entail more work for the teacher, and perhaps he would require assistance, but it would fulfil the spirit of clinical teaching.

We have already mentioned, when considering the teaching of Surgery, that the student ought to have a systematic knowledge before he begins his clinical work, and we would advocate his attendance upon the junior course of Surgery already referred to; at the same time, or immediately afterwards, he would attend the out-patients' room, and then he would begin his usual work. We might mention in passing that an arrangement by which the assistant-surgeon attached to each should teach in the out-patients' room the junior students attending these surgeons' clinical lectures appears to be an excellent idea. Let the student of Clinical Surgery, in the first instance, then go to the out-patient department. The question to be next considered is the scope of clinical teaching. We have only to glance at the suggested order of study in any of the three Universities already referred to in order to see how absurd it is, at all events on paper. Everything, of course, depends upon the individual teacher's method of instruction. At present it is possible that a student who knows nothing of the brain, may have to listen to a clinical lecture on a cerebral tension or a man who knows nothing of Pathology or of medicine may have to attempt to take an intelligent interest in a clinique upon proposed surgical interference in cases of gall bladder, ulcerated stomach, renal or thoracic affections.

Plainly, the teaching of Clininal Surgery, to be satisfactory, must be constructed to meet the requirements of the student, both junior and senior. Lectures, therefore, should be arranged with this object in view, say one for junior and one for senior each week; sub-divisions, if such be held, ought to be mainly for seniors; bedside instruction is essential for all. We would further add that the clinical teaching does not cease when the patient has been lectured or cliniqued upon, and any operation,

which may be necessary has been performed. The adequate illustration of the progress and after-treatment is too often neglected.

We have already pointed out that one of the Scottish Universities advises Clinical Surgery to be taken in the Final year. With their recommendation we are in complete agreement.

3. *Operative Surgery.*—The proper period in the curriculum for Operative Surgery is before the student goes up for his final examination. Sufficient time, however, must be allowed for the subject to be properly taught. It should not be merely a coach class for the "final."

We have heard of the whole of an Operative Surgery course, including the performance of numerous operations, having to be completed in thirty working days. This cannot be described as teaching; cramming is a more appropriate term.

When properly taught, Operative Surgery ought to include not merely lectures; the student should be taught to carry out his manipulations deliberately and carefully. The proper place for the course in the curriculum is probably before the last winter session. The final examination might, however, with advantage be divided into Systematic and Clinical portions, the latter to be taken, say, three months later than the former. The Surgical Clinical might, with advantage, include Operative and Practical Surgery. If this plan were adopted Operative Surgery might be taken out during the last summer.

Our views on the teaching of Surgery may thus be briefly defined as follows: When the student has a knowledge of Anatomy and Physiology he ought to attend a junior course of Surgery; he then begins his clinical work, preferably in the out-patient department, when such an arrangement can be carried out; he next proceeds to clinical teaching in the wards as a junior, he dresses and Clerks and receives bedside instruction daily; in the final winter he attends lectures upon a serious course of Surgery and Clinical Surgery. Operative Surgery ought not be left until the last summer session, unless at least fifty working days are allowed for the course. It had better be taken in the last summer but one.

SURGERY

THE Editor has asked me my ideal of how Surgery should be taught, granted that my hand was a free one. It is impossible to answer such a question without first referring to the drawbacks associated with the present method. Systematic and

Clinical Surgery are at present taught to classes composed of Juniors—students in their second year only beginning the study of anatomy—and Seniors—students in their last year. It hardly requires an apology for common sense to estimate the utter absurdity of such a system, and it is needless to dwell further on the farcical comedy, or rather the screaming farce, which the junior student has to take part in.

What does a systematic course of Surgery consist of? Well, to put it briefly, a scurry on the part of the lecturer to cover Surgery in a six months' course of a hundred lectures. Read the notes of a student and too often it is the perusal of a painful, a very painful parody of the ideas which the lecturer has endeavoured to inculcate.

Why are text-books written for students, and why are they successful? Simply because the student is not satisfied with the lectures, no matter how good the lecturer.

The student generally patronises the individual and the class pleasantly capable of inducing easily assimilated knowledge, and the class which fulfils this demand is the tutorial class, an informal class where questions are usually asked and the difficulties of the student explained.

The only way difficulties can be estimated and explained is by questioning, and it is with such a main principle the whole of Systematic Surgery should be taught.

Junior students, after the second, or preferably third professional, ought to have a class of three months' duration. In this class the student would be, first of all, instructed to purchase and read certain portions of a good text-book; the teacher and his assistants would then, by means of questioning small classes, appreciate those points which gave rise to difficulty and consequently be able to explain them. In other words, the junior class would be instructed in the broad principles of common sense as applied to Surgery, and instructed how to use the various senses, especially the eyes and hands, in the elucidation of disease and injury.

Systematic Surgery should be on the same principle for senior students. QUESTION, Question, question, with the exhibition of pathological specimens, is the way, and the only way, a knowledge of the students' shortcomings can be ascertained.

Throughout such a course there should be a great system most carefully prepared for the estimation of both injury and disease, and a system which is applicable to both.

I presume the Editor includes Clinical Surgery under the larger head of Surgery, and in this the same fault holds as far as present teaching is concerned, that is the admixture of

Juniors, on the threshold of Surgery, and students at the termination of their course.

Clinical lectures as now given are not wanted to the extent now in vogue; it is practical teaching to small groups of students of the ordinary common surgical complaints that are of value. In present-day teaching there is something radically wrong. Let the students assist at operations; give them specimens to prepare, mount, and write about; get photographs taken and let each one have a copy.

Every student ought to be practically *drilled* in aseptic surgery and surgical appliances. Attendance at surgical operations is usually ridiculous unless the student is standing by and has explained to him the various steps of the operation. What earthly use is it for the student to sit and watch a prostatectomy or the like?

Take a few men in to an operation, instruct them in the methods employed, the reason for the operation, the various things seen, and the student can be instructed, ask questions, and as a result a good practical man is turned out.

Where does the student go for choice when he seeks instruction, where does the practitioner go to learn? The Out-patient Department, where whitlows, ulcers, tubercular sores are dealt with, in fact the very things the student is not taught in Clinical Surgery, and which the clinical lecturer does not think suitable for the wards.

Perhaps, Mr Editor, you have had enough of my remarks, but you will see that the gist of them is—small numbers and practical teaching.

SURGERY

THE foundation of Surgery is Anatomy. Shaky anatomy is worse than a shaky hand in a surgeon. The modern surgeon requires, however, to know pathology, and the best surgeon is he who is also a good physician. Such *obiter dicta* indicate that the surgeon must have a good knowledge of anatomy, physiology, pathology—including bacteriology—and medicine, but for this to be possible, post-graduate work in surgery is imperative. The art as well as the science must be studied, and I take it that the editor, when he asks for my views in a short article for the educational number of the journal upon how surgery can be best taught, means, how is the student best taught surgery for his after work in practice. To that aspect of the question I shall restrict my remarks.

It must be presupposed that the student has passed his first

professional examination, and also Anatomy and Physiology in his second examination, which is equivalent to having reached his third winter of study. If anatomy be, as I believe it to be, the foundation of surgery, it is absurd to attempt to teach a student surgery before he knows the elements of that subject; therefore he should only attend a class of systematic surgery when he has passed his examinations in anatomy. Similarly, it is hopeless for him to attend a class of clinical surgery and the wards of the Infirmary until he has acquired some knowledge of the principles of surgery. The class of systematic surgery should be divided into three sections, fifty lectures or thereby in each, (*a*) Science and principles, (*b*) Regional surgery, (*c*) Operative surgery. No clinical surgery should be done until the lectures in the first of these have been attended. I believe in lectures illustrated by diagrams, specimens, etc. Regional surgery can be thoroughly exemplified by specimens, and the students should be advised to go to surgical museums to see the specimens for themselves. It is not necessary to have demonstrations by a tutor; personal observation—self-education of the eye—is much more valuable. This, however, is only preliminary, and adjuvant to the most important part in the teaching of surgery, viz., work in the wards of an hospital. There is no doubt that a thorough grounding in the science of his profession is an absolute necessity for the man who is to be successful in the future. It can never be attained after graduation. I would rather have the man who has the good foundation in anatomy and pathology with a smattering of clinical work, than the reverse. Nowadays, with a curriculum of five years, there is no reason why the plan of teaching adopted should not give the average man both. The whole of the first and second subjects should be got rid of in three years, and the practical work of the doctor should be done in the following two; but here it must be observed that the average man takes six years and not five to graduate. Why? Because the subjects of the first and second professional examinations are made so difficult that a large percentage of students fail to pass and have the later years hampered by the need to work at subjects which should have been passed at an earlier period of their study (*vide* Report in the *Brit. Med. Journal*).

Having unburdened my soul on this part of the subject, I reach the important question: How should clinical surgery be taught? And my answer is, in the wards of the hospital. It is not in the operating theatres, nor by lectures on surgery in wards or theatres; the student must have opportunities to observe patients in the wards before and after operation. He

must be instructed how to take their histories and how to examine them. To see and touch is of the most primary importance. I would advocate, therefore, the maximum of ward work. The patient's progress should be daily noted, and the significance of variations in the pulse and temperature should be brought before the students by the surgeon himself, who, from his experience, can best interpret their meaning, and educate the student. When and why dressings are changed, tubes removed, stitches taken out, treatment varied, and a host of other points in practical surgery can thus be inculcated. When should the patient get out of bed or leave the hospital? How soon can he return to work? etc. etc. These questions should all be discussed, and it is just upon such points that the surgeon's experience can he best utilised in teaching. The students should see the surgeon examine the patients, and by observation of the methods he adopts, learn how to do it themselves. "Medicine throughout all its departments is a science of observation; memory alone, however retentive or diligently assisted by teaching, is unable to afford the qualifications for practice" (Syme). The surgeon should show the way, and the more the student can observe the methods he adopts the better. To see a fracture set and put up in splints is incomparably better for the student, and more lasting in its educative effect, than hours of explanation. Clinical lectures, so called, should be mainly to show the results of operation, and to elucidate through patients some of the more esoteric diseases.

I would therefore, if given a free hand in teaching clinical surgery—that is to say, if it were possible to eliminate the need of teaching for examinations — the demoralising system of cramming—insist that students attending wards under my care, should spend the greatest part of their time in the wards, where they would see the patients before treatment had been begun, have an opportunity to observe their examination with a view to diagnosis, and follow up the after treatment. I would strictly limit the time they would spend in the operating theatre—the greater part of the time in the theatre being, in my opinion, lost time. Such a limitation of time would be best attained and the student profit most, if only a small number was admitted at one time, so that the individual student could see, step by step, what the surgeon was doing. Occasionally, when unusual operations were being performed, larger numbers might be present, that their interest might be stimulated and the art of surgery be admired. I would make the clinical lecture as little of a systematic lecture as possible, and illustrate the art of surgery as much as possible, except occasionally when a group of patients could be shown, to illustrate resemblances and dis-

tinctions in allied affections. Attendance at the surgical out-patient department by all students would be provided for, and a section of my class would go to that department on the days when I operated.

For real clinical work the students should be taught in small cliniques, and for this it is necessary to have numerous separate charges in hospital.

Births and Deaths registered in Eight of the Principal Towns of Scotland during August 1906

DURING the month of August 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4134 living children, of whom 2125 were males and 2009 females. These births are 47 more than in July, and 44 more than in August of last year. The equivalent annual birth-rate is 27.2 per thousand of the estimated population, and is 0.3 per thousand above that for the previous month, but 0.3 below that for the corresponding month of 1905. The birth-rate for the month varied from 30.3 in Greenock to 22.3 in Paisley. In Leith the rate was 29.9; in Glasgow, 29.1; in Dundee, 27.3; in Aberdeen, 26.7; in Edinburgh, 23.4; and in Perth, 22.5.

Of the 4134 births, 333, or 8.1 per cent., were illegitimate. The rate of illegitimacy was highest in Perth, 13.6, and lowest in Leith, 3.8 In Aberdeen it was 11.1; in Dundee, 9.4; in Edinburgh, 8.1; in Glasgow, 7.8; in Paisley, 6.7; and in Greenock, 6.0.

The deaths of 2106 persons were registered in these towns during the month, of whom 1073 were males and 1033 females. These deaths are equivalent to an annual mortality-rate of 13.9 per thousand of the population, a rate which is 0.2 below that for July, and 0.4 below that for the corresponding month of last year. The highest death-rate occurred in Perth, 17.1; and the lowest in Leith, 12.1. The rate in Greenock was 15.7; in Dundee, 14.6; in Glasgow, 14.5; in Aberdeen, 13.6; in Paisley, 13.0; and in Edinburgh, 12.2. The rate in Glasgow, Edinburgh, and Dundee is below that for the previous month, but in the other towns it is above the corresponding rate for the previous month.

Of the 2106 deaths, 757, or 35.9 per cent., were of children under five years of age; and 510, or 24.2 per cent., were of persons aged sixty years and upwards. The former are 115 more than in July, but 26 less than in August of last year; the latter are 40 less than in the previous month, but 9 more than in the corresponding month of last year.

Deaths of infants under one year of age numbered 527, which is 133 more than the number recorded in July, but 16 fewer than that recorded in August 1905. These deaths represent an infantile mortality-rate of 126 per thousand births. This rate is 32 above that for the previous month of the current year, but 3 below that for the corresponding month of last year. The highest infantile mortality-rate was recorded in Glasgow, 145; and the lowest in Edinburgh, 73. The rate in Dundee was 141; in Aberdeen, 132; in Leith, 117; in Greenock, 110; in Perth, 100; and in Paisley, 95. The rate in all of these towns, with the exception of Edinburgh, is above the corresponding rate for the previous month.

Deaths from the principal epidemic diseases numbered 221, and were equivalent to an annual death-rate of 1.5 per thousand of the population. The actual number of deaths is 34 more than the number for July, but 47 less than that for August of last year; the death-rate is 0.3 per thousand above that for the previous month, but 0.3 below that for the corresponding month of 1905.

No deaths from small-pox were recorded. Measles caused 24 deaths, which is 18 below the number for the previous month, and 21 below that for the corresponding month of last year. Deaths from scarlet fever numbered 4, being 2 less than the number for July, and 2 less than that for August 1905. Hooping-cough was the cause of 45 deaths, which is 8 below the number for the previous month, and 18 below that for the corresponding month of last year. Deaths from diphtheria numbered 14, and were 3 below the number for July, but 6 above that for August 1905. Enteric fever caused 11 deaths, fever of uncertain origin 1, and cerebro-spinal meningitis 21. The last-mentioned all occurred in Glasgow, and are 2 less than the number recorded from this cause during the previous month. Deaths from diarrhœal diseases numbered 101, and were 65 above the number for July, but 33 below that for August of last year.

Eight deaths were assigned to influenza, which is 4 more than in the preceding month and 5 more than in the corresponding month of last year.

From puerperal septic infection 3 deaths were recorded; from diseases of the heart, 204; from premature birth debility, 84; from alcoholism, 6; and from malignant disease, 145, of which 75 were ascribed to carcinoma, 5 to sarcoma, and 65 to cancer not otherwise defined.

Deaths from pneumonia numbered 137, and constituted 6.5 per cent. of the total deaths, while those from bronchitis numbered 83, and constituted 3.9 per cent. of the total. The

former are 12 less than in July, but 13 more than in August of last year; the latter are 17 less than in July, but 16 more than in August 1905.

Tuberculosis diseases caused 297 deaths, which is equal to 14.1 per cent. of the total mortality, and is 41 less than the number of deaths from these causes in the previous month of the present year, but 22 more than the number in the corresponding month of last year. Of the 297 deaths, 164 were assigned to phthisis.

Editorial Notes and News

The Edinburgh Post-Graduate Course.

THE success of the post-graduate course has exceeded the fondest hopes of its promoters. No fewer than 68 men entered their names, and most of them entered for all the classes. Some, however, were better attended than others, and it is interesting to note that the most popular of all were those on Bacteriology and Hæmatology. There could hardly be a more significant proof of the spirit of the age. Clinical pathology is growing every day more and more important, and once more the students are showing themselves wiser than the authorities in taking out these non-compulsory classes.

The success of this course is largely due to the organising committee, and most of all to its untiring secretary, Dr Edwin Bramwell, who has devoted himself heart and soul to his work. We have heard some very nice things said of those who are conducting the classes, and we feel sure, now that the scheme has got so satisfactory a send-off, that Edinburgh will before long occupy as satisfactory a place in post-graduate as she long has in undergraduate teaching.

It is most encouraging to those who look to the welding of the Edinburgh Medical School into one organisation to note the hearty co-operation of the University and the Extra-Mural School.

Dr Allan Jamieson.

AMONG the retirements from the teaching staff of the Royal Infirmary, that of Dr Allan Jamieson must not pass unnoticed. For nearly twenty-three years Dr Jamieson has taught Dermatology—for the greater part of that time gratuitously—to successive generations of students. After a long struggle he obtained in 1884 the necessary foothold in the Infirmary. Gradually the department grew, and he leaves, almost completed, a skin depart-

ment second to none in Great Britain. To him fell all the hard labour of the pioneer, but in demitting office he has the satisfaction of work well done, and the gratification of having added an important coping-stone to his Alma Mater. We have no doubt that his services will be appropriately recognised.

The Toronto Meeting.

EVERYONE has come back delighted with Toronto. Scotland sent a strong representation, and we are glad of the opportunity of congratulating Dr Barbour, one of our Directors, on the LL.D. which the University of Toronto conferred on him. There was nothing specially noteworthy about the meeting in the medical line, but every section was well attended, and the discussions were interesting and often lively. The hospitality of the citizens was unbounded, and the weather excelled itself. The traditional fly in the ointment was provided by the American baggage system: we are unable to print the views of the British visitors on that much vaunted institution.

The University buildings are magnificent. A wise foresight led the founders of Toronto to reserve a large tract of land for a University, and their successors reap the benefit. Their University Court has no sites to look out for: all that is requisite is to fix on the most suitable part of the ground to build whatever is necessary. At present the hospital is some distance from the school, but arrangements are well advanced for the erection of an up-to-date hospital in the immediate neighbourhood of the University.

Medical Inspection of School Children.

IT was something of a surprise to find how unanimously the House of Commons accepted the proposal of the systematic examination, for it is an open secret that Mr Birrell was in favour of it, but shrank from putting it in the Bill. That inspection was urgently called for has long been the opinion of the medical profession, and it is, we think, beyond doubt that the necessary outlay will be more than returned to the nation. It is well, however, for us to keep in mind that the Education Bill does not apply to Scotland, and that it is not possible to carry an amendment extending that one provision to this country. There is, however, coming before Parliament during the autumn session a Bill providing for the feeding of school children, and we do not think it should be beyond the ingenuity of some of our Scottish members to frame a clause which will enable us to introduce inspection at once. Scotland is not accustomed to lag behind in educational matters.

University of Edinburgh Medical Passes

THE following is the official list of passes at the recent professional examinations for degrees in Medicine and Surgery:—

First Professional Examination.—T. A. Adams, Peter Allan, Alexander Archibald, O. H. Blacklay, Robina Blackwood, H. R. Borcherds, G. S. Brock, W. D. Brownrigg, Gilbert Burnet, J. le F. C. Burrow, Andrew Campbell, A. D. Campbell, T. F. Craig, W. A. Dunn, T. R. Evans, A. J. Ewing, M.A.; A. G. Forbes, T. E. Forrest, A. S. Glynn, Christopher Gordon, G. M. Graham, A. L. Grant, Max Greenberg, J. D. Gunn, B.A.; T. E. Harwood, B.A. (with distinction); John Hepburn, W. R. C. Heslop, D. van V. Hoffman, A. J. G. Hunter, C. C. Iles, G. L. W. Iredale, W. D. Kirkwood, J. St P. Knight, James Lamberton, J. P. Litt, J. M. Logie, F. R. Lucas, W. C. Lyons, D. J. M'Afee, W. V. Macaskie, H. J. M'Caw, A. E. P. M'Connell, Marion I. A. Macintyre, A. E. Mackenzie, J. M. Mackinnon, P. W. Maclagan, K. A. Maclean, Lorna D. M'Lean, William M'Naughton, N. F. Mann, A. M. Masters, S. N. Mokand, D. C. Monro, B. B. Morgan, A. A. Morison, D. M. Morison, T. C. Murphy, J. M. Murray, W. P. Murray, P. J. Olivier, H. G. Parker, C. R. Patton, J. F. Penman, Stanley Pinion, A. N. Pollock, A. W. Rattrie, H. C. Robbins, Christopher Rogers, T. R. Sandeman, W. A. Shafto, Samuel Sloan, A. N. Smith, K. F. Sonntag, N. W. Stevens, John Stevenson, George Sutherland, R. J. Tait, H. C. Todd, J. A. Tomb, R. R. Watts, W. L. Webster, H. J. G. Wells, R. A. C. Wilkes, S. H. Wilkinson, H. T. Williams, N. C. Young.

Second Professional Examination.—A. H. T. Andrew, B. S. Browne, J. A. Browne, J. E. Brydon, Henry Burns, H. G. Carter, Jean G. Cathels, J. J. P. Charles, D. D. Craig, Fred. Dillon, W. J. Duncan, Helen Forbes, Kenneth Fraser, W. T. Gardiner, P. J. Garvey, Alexander Gibson, M.A. (with distinction); H. R. B. Gibson, A. T. Gowan, W. B. Grant, F. W. Greaves, J. A. W. Hackett, R. W. Hauman, Herbert Hutson, H. E. Johnson, James Langwill, J. M. Lawl, A. J. Bruce Leckie, A. R. Leggate, Edward Lewis, V. D. O. Logan, J. C. Lorraine, J. V. MacDonald, G. M. Mackay, Ian C. Mackenzie, D. L. MacKenna, A. K. Maclachlan, Eva Meredith, J. B. de W. Molony, Anna L. Muncaster, N. S. Neill, C. T. Newton, J. H. Peek, Alfred R. Price, K. A. Rahman, Myfanwy D. Rees, E. M. Reid, F. E. Reynolds, M. B. Smith, H. M. Spoor, J. W. Stirling, D. E. Stodart, E. A. Strachan, Dr R. P. Walther, John Ware, W. S. Watson, Gordon Wilson, G. G. Wray.

Second Professional Examination (Old Regulations). — S. Rowland.

Third Professional Examination.—G. J. Adams, C. F. Bainbridge, J. P. Berry, Mary F. Bignold, H. W. Binks, F. V. Nanka Bruce, E. A. Brummitt, R. A. Campbell, Theodore Craig, F. W. M. Cunningham, C. H. Derksen, Thomas Derrick, C. A. A. Dighton, V. Lloyd Evans, S. B. Faulkner, T. Y. Finlay, Stephen Forrest, M.A.; David Geddes, G. R. Gray, J. G. Greenfield (with distinction), J. A. Harley, F. G. Harper, A. M. Hewat, J. M'A. Hill, W. P. Holden, M. J. Johnston, W. L. Johnston, Catherine Kirk, M.A.; R. H. S. Laugeveldt, A. F. Lee, G. H. Lowe, John Macdiarmid, L. R. H. P. Marshall, C. J. van der Merwe, Barbara Richardson, W. G. Riley, A. H. M. Robertson, W. A. Robertson, R. L. Scott, Thomas Smyth, L. D. Stephen, Alice M. Thompson, H. B. Thomson, A. L. Thornley, Lydia K. Towers, A. E. Turnbull, V. A. Vijayakar, R. N. Wallace, W. H. te Water, W. C. Whiteside, J. L. Masterman Wood.

Royal College of Surgeons of Edinburgh

THE following gentlemen, having passed the requisite examinations, were, at a meeting of the College held on 20th July, admitted Ordinary Fellows:—Charles Henry Allen, M.B., Ch.B., Metheringham; James Reginald Atkinson, M.B., C.M., Crewe; Kaikhusru Dadabhoy, L.R.C.S.E., Edinburgh; John May Darling, M.B., Ch.B., Edinburgh; William Henry Duncan, L.R.C.S.E., Maryhill; Samuel Linley Heald, M.B., Ch.B., Leeds; Thomas Walter Irvine, M.B., C.M., Major, Indian Medical Service; Joseph Alan Longley, M.B., Ch.B., Leeds; John Clark Muir, M.B., Ch.B., Edinburgh; John King Osborne, M.B., C.M., New South Wales; George Potts, L.R.C.S.E., Maidstone; Andrew Taylor Ross, M.D., Glasgow; David Herman Wessels, M.B., Ch.B., South Africa; and Alfred Lambre White, L.R.C.S.E., Edinburgh.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow

THE Quarterly Examinations of the above Board, held in Edinburgh, were concluded on 23rd July, with the following results:—

First Examination, 5 years' course.—Of 42 candidates entered, the following 14 passed the examination:—George Francis Hegarty, Cork; John Wight Robertson, Edinburgh; Satya Charan Pal, Bengal; Thomas Noel Usher, New Zealand;

George Fox Neill, Edinburgh; Amabile Caruana, Malta; Harold Henry Field-Martell, Australia; Rankin Greig Walker, Montrose (with distinction); Richard Antovy Mirzan, Smyrna; William Teulon Torrance, Scotland; Alfred Ernest Tughan, Belfast; Samuel Edwin Albert Acheson, Belfast; Charles Breckon Robinson, Danby; and Thomas Crawford, Co. Monaghan; and 4 passed in Physics, 9 in Biology, and 3 in Chemistry.

Second Examination, 4 years' course. — Of 4 candidates entered, the following 2 passed the examination:—John Joseph O'Sullivan, Cork; and George Harrison, Warrington; and 1 passed in Anatomy and 1 in Physiology.

Second Examination, 5 years' course. — Of 30 candidates entered, the following 13 passed the examination:—Richard Howard La Barte Cummins, Melbourne; William Forest Mitchell, Derbyshire; Baldev Singh, India; Thomas Graham Shand, Greenock; Jacobus du Toit Malan, South Africa; Joseph Louis Pinto, Portuguese India; Charles Joseph Evans, Cork; Lily Holt, Australia; William Henderson, Scotland; Archibald Davidson, Melbourne; James Grosert, Leith; Edward Lewis, Anglesea; and James Aiken, Victoria; and 1 passed in Anatomy.

Third Examination, 5 years' course.—Of 38 candidates entered, the following 20 passed the examination:—Henry George Ramsbottom, Lancashire; George Walter Rundle, Australia; George Edward Walker Henderson, Edinburgh; Norman Grenville Walshe-Davidson, Ballycastle; Thomas Mohan, Louth; Mary Rathbone, Llangollen; Charles Caldwell Campbell, Melbourne; Robert Marmaduke Riggall, London; William Harvey Bennett, Chester-le-Street; Samuel Middleton Ware, Melbourne; Henry Hollister Jackson, Australia; James Bolton Kelso, Co. Derry; Robert George Sherlock, Jamaica; Byramji Shavakshah Tarapurvalla, Bombay; Peter Morrison Tolmie, Inverness; Charles Austin Paterson, Rio de Janeiro; William Rutherford Waddell, Belfast; Edward John Lumsden, Co. Wexford; Lizzie Lyford-de la Harpe, Ceylon; and Richard Howard La Barte Cummins, Melbourne; and 1 passed in Pathology and 2 in Materia Medica.

Final Examination.—Of 62 entered, the following 23 passed the examination and were admitted L.R.C.P.E., L.R.C.S.E., and L.F.P. & S.G.: — Mary Deborah Hancock, Surbiton; Khorshed Sorabji Kanja, Bombay; John Andrew Kane, Toronto; Thomas M'Laren Galloway, Kirkcaldy; Michael Gavin, Dunfermline; Ernest Martin, Alcester; Leonard Clarke Webster, Launceston; William Wallace Dunlop, Edinburgh; David James Melville Legge, Dundee; Henry Albert Pascoe,

Durban; Edward Albert Williams, Chester (with honours); Walter Scott, Canada; John Alfred Steele Phillips, India; Gustavus Herbert Powell, County Cork; Leopold Henry Gill, Gibraltar; Patrick Raoul Eskell, Port Elizabeth; John Owen Shircore, India; Thomas Alexander Gregg, County Antrim; Carlo Ferruccio Fiaschi, New South Wales; William James Geale, New South Wales; Constance Helena Colley, Ireland; William Dunseith Dickson, Ireland; and Sydney Frank Henderson Everill, Worcester; and 2 passed in Medicine and Therapeutics, 2 in Surgery and Surgical Anatomy, 12 in Midwifery, and 9 in Medical Jurisprudence.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE

By EDWIN MATTHEW, M.A., M.B., F.R.C.P.,
Assistant Physician, Leith Hospital

ARTERIO-SCLEROSIS

THE subject of arterio-sclerosis has during recent years become one of the most interesting in medical science. And when we consider that in arterio-sclerosis we have a condition which is responsible for cutting off in their prime more men than most other diseases, it becomes at once not only interesting, but any advances which have been made in solving its ætiology and treatment are of first importance. Both experimentally and clinically much has recently been done in elucidating its histological nature, and in recognising the very wide changes for which it is responsible. The modified conception of arterio-sclerosis as a condition in which there is merely thickening and disease of the arterial walls is undoubtedly much too narrow, and recent investigations all point to its being a generalised condition, not localised merely to the circulation, and producing changes, the result of its mechanical disturbances, but a condition responsible, in addition, for changes in tissues and organs, such as the liver, kidneys, heart, etc., not altogether the result of the arterial degeneration.

Alfred Stengel has a most excellent paper on arterio-sclerosis in the *Proceedings of the Philadelphia Medical Society*, in which he rightly insists that arterio-sclerosis must be looked on as a general disease, and considers that, regarded as such, we may look on it as existing clinically in three stages:—

1. A preliminary stage, difficult of recognition in its beginnings, and confusing to the clinician in his efforts to distinguish the part of the ætiological factors from that of the arterial disease in the symptom-complex.

2. A middle period during which the arterial disease is easy to recognise, but in which secondary organic changes have a rôle of variable importance.

3. A final stage of failure of circulation, organic failure, and terminal infections.

It is only when an individual has reached the middle period that diagnosis is usually made and treatment commenced; but latterly chief interest and investigation have been directed more and more to what is occurring during the preliminary or pre-sclerotic stage.

This preliminary stage in arterio-sclerosis is the one which requires still much clearing up. Hypothetically various suggestions might be made regarding what is occurring during this period. Some have suggested a condition of viscosity of the blood that impedes the circulation, while others suggest an antecedent stage of continued high blood tension, the result of some toxic influence. It is undoubtedly the case that, in tracing back the history of well-developed cases of arterio-sclerosis, there is always to be made out disturbances of function of various organs—disturbances of digestion, slight circulatory derangements, loss of vitality, nervous depression, etc., all of which are probably due to the commencing and advancing arterio-sclerosis.

During this first or preliminary stage, Stengel has never been able in undoubted cases to convince himself that there is a state of continued hypertension, and he is inclined to believe that at this time clinically the condition is one of decreased tension, with a tendency to temporary elevations. To account for this he suggests a loss of elasticity either in the media or intima of the vessels, due to a toxic degeneration of the walls of the vessels, and not spasm due to such toxic agents. This view of the pathological condition in the pre-sclerotic stage he bases on his findings with regard to the arterial pressure, and various other clinical symptoms, such as paroxysmal sweating, variable quantity of urine, and slight œdema. How far this clinical view agrees with the results of experiment will be seen later. Even at this early stage the condition is a general one, and already the changes are widespread all over the body.

Looking, therefore, on arterio-sclerosis in its preliminary stage as a definite disease, clinically separable, he recognises various types in which it manifests itself:—

1. *The Nutritional Type.*—Here there are obscure disturbances of general health, with digestive troubles, pseudo-anæmia, and

gradual loss of weight. There is generally a progressive deterioration of health without any definite cause, and a tendency to repeated attacks of minor ailments, from which the individual suffers more than the ailment itself would lead one to expect. The pseudo-anæmia he looks on as very important in the diagnosis of the first stage of this type. This, he thinks, is not a true deterioration of the blood, but a pallor the result of contraction of the vascular channels.

2. *The Neurasthenic Type.*—Here the various signs of neurasthenia are present in varying degrees, but it is not easy to distinguish between the symptoms of neurasthenia occurring in a developing arterio-sclerosis and secondary arterio-sclerosis following on an already existing neurasthenia. But at any rate one should always be on the look-out for a commencing arterio-sclerosis as probably accounting for some of these unexplainable cases of neurasthenia.

3. *Nervous Type.*—In this type nervous symptoms are conspicuous. Here we meet with a tendency to vertigo, tinnitus, and disturbing sounds in the ears. In some reported cases there have been extreme muscular weakness. Migraine and neuralgia are also often present.

These types are to a certain extent arbitrary, but at any rate they recognise fully the necessity of an early diagnosis of arterio-sclerosis. In persons, particularly under middle-age, suffering from some unexplainable ailment, it is essential to be on the look-out for early manifestations of arterio-sclerosis as affecting various organs before obvious arterial degeneration has set in. A careful examination of the cardio-vascular apparatus is indicated, of the heart and blood-vessels from all points of view, so as to exclude a commencing arterio-sclerosis, or apply appropriate treatment if it be present.

In the second or sclerotic stage, arterio-sclerosis is easily recognised. Here we have evidence of actually thickened vessels with hypertension, and of changes in the heart. As a generalised disease, any or all of the organs may be involved, but, as might be expected, the stress of the condition is felt sometimes in one direction and sometimes in another. In one individual the extreme changes in the vessels themselves may be the chief manifestation, in another the heart may suffer most, and in another the changes may be most marked in the kidneys.

In the second stage Stengel classifies his cases under the following headings: 1. The thoracic type, subdivided into (*a*) cardiac and (*b*) aortic. 2. The abdominal type, of which there are (*a*) renal, (*b*) intestinal, (*c*) pancreatic, and (*d*) hepatic varieties. 3. Cerebro-spinal type. 4. Arterio-capillary type.

In the cardiac variety of the thoracic type the heart becomes

irregular, with symptoms of myocarditis, and it may be also of angina pectoris. This type results in all probability from involvement of the coronary arteries. The aortic type includes cases in which we have dilatation of the aorta, and cases where without dilatation the aorta shows sclerotic and calcareous changes, with the physical signs of roughening of the arch of the aorta.

The renal type we see in individuals who show symptoms of chronic interstitial nephritis. In the majority of cases the renal conditions do not advance to a well-marked interstitial nephritis. On the other hand, in most the renal disease is only a part of the arterio-sclerosis, which is the pronounced condition in the individual. This latter fact requires a more general recognition, as too much stress has been laid on the renal fibrosis being a separate condition, or even as responsible for the general arterial degeneration.

The intestinal variety he thinks is not usually recognised. It is indicated by atrophy of the mucous membrane, with a tendency to chronic colitis, with forms of sudden painful obstructions of the bowels. The hepatic variety is present when along with an arterio-sclerosis we have an hepatic cirrhosis, it being probable that when they do occur together the same cause is operative in producing both.

The cerebro-spinal type is common. It is evidenced by temporary paralysis or aphasia, slight convulsive seizures, and attacks of sudden unconsciousness. And it may be that a number of definite nervous diseases have as an underlying basis arterio-sclerosis of the cerebral vessels.

The arterio-capillary type includes the cases in which the condition of the vessel walls is the conspicuous feature without involvement of any definite organ.

These views include our knowledge on this subject from a clinical standpoint, but, in addition, recent advances have been made in the experimental production of arterio-sclerosis in animals. These attempts will naturally be of great help to the clinician, and are the only means of arriving at an explanation of its initiation in man—its limitations, its progress and nature, and the external and internal conditions that cause it or encourage its development. Following on Oliver and Schäfer's discovery of the action of the substance of the adrenal gland, and on the recognition of a condition of high tension in arterio-sclerosis, various experiments have been made on animals with the view of ascertaining the pathological changes, if any, in the vessels resulting from its use.

Josue, by intravenous injections of adrenalin into rabbits, has described changes in the aorta somewhat akin to those in man. Others have subsequently corroborated his observations, and

Pearce and Stanton give the most recent results with adrenalin in this direction. Their results are more than interesting.

They experimented with rabbits, employing repeated injections of adrenalin (1 in 1000), 3 ♏ being the initial dose. This was injected every other day until 7 or 8 were given, and, if the animal survived, the dose was gradually increased for some weeks until 20 to 25 ♏ were given each day. The animals were killed after periods varying from a few days to eight and a half weeks.

The results may be summarised. In one group of animals, representing those killed at the earliest time after a given number of injections, lesions were found only in the aorta—the brachial, carotid, and renal vessels escaping. In the aorta they were most marked in the thoracic portion of the arch, and it is to this part of the aorta that the changes are limited, being seldom found below the cœliac axis or in the first part of the arch. The first change, seen about the ninth day after beginning injections, is a faint, irregular, greyish streaking of the intima without thickening.

Then in animals which have received a few more injections more definite lesions are apparent. They are "irregular, isolated, or confluent areas of a pearly grey colour and almost constantly calcified."

Subsequent lesions are even more marked. The aorta becomes distorted and shows irregular dilatations and is now rigid and non-elastic. Small aneurismal dilatations are often present. Ulceration with atheroma have not been produced. Microscopically the early lesions are found in the middle coat of the aorta, difficult to determine exactly, but probably a simple necrosis limited to the muscle fibres. The elastic fibres are, however, definitely affected. Instead of being wavy and definitely separated from each other as in a normal aorta, they lose this appearance and close up, straighten out, and are swollen.

Subsequent changes after more numerous injections are more diffused. The entire circumference of the vessel is now involved. The elastic tissue cannot now be distinguished as individual fibres, and irregular degenerated areas in the media show infiltration with lime salts without definite calcification. This deposition of lime takes place first between the elastic fibres, the destruction of the muscle fibre being older and therefore probably primary. Of great importance were the changes found in the intima. These were found in patches opposite the damaged portions of the media and are proliferative changes of the endothelial lining and sub-endothelial tissues. This is undoubtedly a compensatory proliferation and evidently for the purpose of strengthening the aorta at the site of the degenerated

media. This compensatory thickening may go on to such an extent as to have a thickness of one-fourth to one-third of the whole vessel wall.

In addition to the aorta, changes were found in other organs. Different animals showed enlargement of the heart, œdema and congestion of the lungs, and occasionally degenerative changes in the heart and other muscles.

The lesions found in rabbits, Pearce and Stanton think, are not entirely analogous to those in man. There is a distinct similarity, however, the lesions being as extensive and causing the same degree of deformity. The amount of atheroma produced in the rabbit, however, is insignificant and limited to the media. But in their experiments a sufficient length of time, from the beginning of the injections to the period of killing, had not elapsed for the presence of degeneration in the areas of proliferated intima.

From their experiments they think that, so far as the nature of arterio-sclerosis and the sequence of the changes are concerned, the primary lesion in this condition "occurs in the media and is essentially the result of changes in the elastica; and that the alterations in the intima constitute a repair process, the object of which is to compensate for the weakened media and the widened lumen."

Such experimental work, combined with accurate and early clinical observations, will in time clear up the problem of arterio-sclerosis and render its prevention and treatment more hopeful than in the past.

SURGERY

By H. J. DUNBAR, M.D.

TUBERCULOUS APPENDICITIS

ALTHOUGH the great majority of the morbid conditions of the vermiform appendix are of an inflammatory nature, it is well to remember that this organ is occasionally the seat of malignant, tuberculous, and other forms of disease, which, on account of their rarity, are liable to be forgotten when making a diagnosis prior to operation, or even overlooked altogether if the disease is little advanced. As recently shown by Rolleston and Jones (*Lancet*, June 2, 1906), we are as yet unable to diagnose cancer of the appendix with certainty, except by laparotomy; and the recognition of tuberculous appendicitis is almost equally difficult. In the *Gazette des Hôpitaux* for April 14, 1906, "L'Appendicite Tuberculeuse" forms the

subject of an exhaustive treatise by Gabriel Hérisson, from which the following abstract is taken.

The term tuberculous appendicitis is to be restricted to those cases in which the appendix is the primary seat of the disease as far as this region of the body is concerned: the much commoner condition of a diffuse tuberculosis of the ileo-cæcal region involving the appendix must be totally excluded. An analysis of numerous statistics indicates that from 1 to 2 per cent. of cases of appendicitis are of tuberculous origin. The disease affects persons of all ages, but is more common between 20 and 40 years—somewhat later than the common form of appendicitis—and the greater number of cases occur in males. The etiological relationship of the simple and the tuberculous variety is a subject of much dispute, and the question can only be satisfactorily settled by further observations. In the author's experience it is extremely rare to find both forms present in the same appendix. From its anatomical structure and position, and from the large amount of lymphoid tissue it contains, the appendix is particularly likely to be infected by the tubercle bacillus; and the fact that the infection does not occur more frequently is probably due to the constant presence of other more virulent and quickly-acting organisms. The bacillus gains access almost always by way of the intestinal canal from milk, meat, swallowed sputum, or from ulceration higher up in the bowel; infections through the peritoneum or by the lymphatics and blood-vessels are quite exceptional, if indeed they occur at all. The pathological anatomy is similar to that of tuberculosis of other organs. The disease commences in the mucous membrane and spreads centrifugally, affecting the different coats one after the other. In the early stages the appendix may appear quite healthy externally, and on incision of it small greyish semi-transparent tubercles projecting slightly above the level of the mucous membrane are found. Later these tubercles enlarge and undergo caseation, causing obvious disease (very often of the free end of the organ), the nature of which, however, may only be recognisable on incision. Occasionally a hypertrophic form is seen where the appendix may be as thick as the small intestine, the walls being enormously thickened and containing large caseous masses. Ulceration is very common, and the ulcers may be small and separate or large and confluent. When perforation occurs, either a localised cold abscess or a general peritonitis results, according as protective peritoneal adhesions are present or absent. Atrophic and cystic varieties of tuberculous appendicitis are noted as rarities. The peritoneum, the cæcum, and the mesenteric glands may all be

infected secondarily to the appendix, and in many cases it is extremely difficult to decide whether the appendix has or has not been the starting-point of the disease.

Some surgeons are of opinion that tuberculous disease of the appendix gives rise to no symptoms, and that there is no clinical condition worthy of the name of tuberculous appendicitis. Such a position is now hardly tenable, for numerous authentic cases have been recorded ; and it is more than likely that many cases thought to be simple would be proved to be tuberculous were careful histological and bacteriological examination of all appendices removed to be carried out.

Clinically two varieties of the disease are recognised, the acute and the chronic. A third form, the latent, gives rise to no symptoms, and is therefore of no practical importance. The symptoms in the acute (tuberculous) are almost identical with those observed in acute simple appendicitis, and need not be detailed. Diarrhœa, however, as a very common accompaniment, deserves mention, as it contrasts with the almost invariable constipation of simple appendicitis, and may thus be of some diagnostic value. In the author's opinion this acute type is due in most cases solely to the action of the tubercle bacillus—not, as has been supposed by some writers, to a secondary invasion by the bacillus coli or other pyogenic organism ; and he cites acute tuberculous orchitis as an analogy in support of his contention.

The chronic form is by far the more common. It is characterised by slight pain, infrequent vomiting, and trifling constitutional disturbance ; but here again diarrhœa is frequently present, and may be of importance diagnostically. On palpation of the abdomen nothing may be made out ; or one may feel a thickened cord-like appendix, or a diffuse indurated mass indicative of peritoneal involvement.

The course of the disease is influenced by many circumstances, general and local. It may terminate in complete resolution, but this is exceptional. More usually it continues to reappear, or, rather, to be exacerbated from time to time ; and it is especially characteristic of the condition that during the relatively quiescent intervals the symptoms are never completely in abeyance. General peritonitis, the result of perforation, in no way differs from that following perforation in ordinary appendicitis. Localised abscesses are usually of a chronic tuberculous nature and may reach enormous dimensions. They cause no constitutional symptoms until spontaneous rupture occurs, when the consequent mixed infection soon exhausts the patient and brings about a fatal termination.

In spite of the slender grounds on which the differential

diagnosis must obviously rest, the author believes that a careful consideration of history and symptoms will enable an exact diagnosis to be made in many cases. Diarrhœa accompanying appendicitis should always arouse suspicion of the condition being tuberculous. Frequent recrudescences of the disease separated by incomplete remissions are extremely characteristic. The previous history of the patient, hereditary predisposition to tubercle, and the presence of tuberculosis elsewhere, particularly in the lungs, are all points of importance; but with regard to the last, it must be remembered that a tubercular subject may be affected with a simple appendicitis. Enlargement of the cæco-appendicular glands would be confirmatory were one able to differentiate such enlargement from inflammatory thickening. The use of tuberculin gives little help, for even a positive reaction only proves that the patient is the subject of tuberculosis—not necessarily that the appendicular lesion is tuberculous. Cold abscesses in the iliac region of course suggest vertebral caries, and this must be carefully excluded.

The prognosis is much more grave than in simple appendicitis, for the disease is insidious, tenacious, and has a strong tendency to spread. It is true that the condition is at first only slowly progressive, but, if left untreated, the cæcum, ileum, peritoneum, and mesenteric glands become successively involved, and eventually the whole organism is menaced. Petit has shown that operation performed while the disease is in its initial stages—when only minute granulating lesions of the mucous coat are present—gives as good results as in simple recurrent appendicitis. If the walls of the appendix are extensively diseased, or if there is secondary involvement of glands, the results are fair, but some relapses will be found. When ulceration is present the cures and failure are about equal. General peritonitis following perforation, and the establishment of a pyostercoral fistula from the rupture of a cold abscess both show a mortality of about 80 per cent. In general one may say that the prognosis is good provided that a diagnosis is made early and promptly acted on, but extremely bad otherwise.

The treatment consists in complete removal of all the disease. In the early stages when the appendix alone is involved the operation is easy, but if a spread have taken place to the wall of the cæcum or the glands—and these must always be carefully examined—total extirpation is a matter of some difficulty. When an abscess is present the appendix must be sought for and removed, although adhesions to bowel and to abdominal wall usually render this an extremely trying operation. Mere incision and drainage is worse than useless, resulting as it does in a permanent fistula. Exploratory laparotomy alone is said

to have a beneficial effect, but this is not lasting unless the disease is principally peritoneal. The only contra-indication to operation is a bad general condition of the patient. If, for instance, he is the subject of advanced pulmonary phthisis, interference should if possible be avoided, for the lung condition is invariably made much worse by operation. When a pyostercoral fistula exists, one must usually be content with scraping the fistulous tract and attending to the general health. When possible, however, a radical operation should be undertaken. Total extirpation of the fistulous mass is difficult and has a large mortality. It is better to close the fistula by exclusion, and then to excise the mass at a subsequent operation if advisable. When the patient is in an advanced hectic condition and has developed waxy disease, general palliative treatment is alone permissible.

DISEASES OF THE THROAT, NOSE, AND EAR

By R. M'KENZIE JOHNSTON, M.D., F.R.C.S.,
Consulting Surgeon for Ear and Throat, Royal Infirmary, Edinburgh,
and
J. S. FRASER, M.B., F.R.C.S.,
Surgeon to the Provident Dispensary, Edinburgh, and
Senior Clinical Assistant, Ear and Throat Department, Royal Infirmary

Ossiculectomy in the Treatment of Chronic Suppurative Otitis Media.

THE importance of terminating, as soon as possible, a chronic discharge of the middle ear cannot be overestimated. Too frequently, however, mild measures are continued far too long, especially in the absence of any urgent symptoms, owing to the desire of the surgeon and the natural anxiety of the patient to avoid the somewhat serious radical mastoid operation. Some method of treatment more active than the routine cleansing of the ear, and yet less severe than the mastoid operation, is much needed. Recent experience tends to show that in ossiculectomy we may have an operation capable in selected cases of doing what is necessary to cure the discharge without all the disadvantages which attach to the radical mastoid operation. In skilled hands it has already produced encouraging results, for Ludewig has recorded forty-two cases where the discharge was cured out of seventy-five cases. It may be well, therefore, to refer at some length to the details of the operation as given in a recent paper on the subject.

In the *New York Medical Journal* (February 17th, 1906) Milton J. Ballin gives an account of the treatment of chronic

suppurative otitis media by ossiculectomy, as improved by Dr Neumann, of Vienna. The history of this operation since its introduction in 1800 is of no great general interest. It is sufficient to state that, as long as ossiculectomy was performed in cases of dry middle ear catarrh and otosclerosis, it proved a failure, but when it was employed to remove necrosed ossicles and to provide good drainage, it met with much greater success.

Neumann found that if he injected a solution of cocaine and adrenalin into the upper wall of the external meatus, he obtained complete bloodlessness and anæsthesia not only of the meatus, but also of the tympanic cavity and its contents.

The indications for ossiculectomy are as follows :—

(1) Obstinate middle ear suppuration, with caries of the malleus.

(2) Obstruction to the flow of pus from the attic or aditus.

(3) Cholesteatoma.

(4) Perforation of Shrapnell's membrane, if at the same time the larger portion of the membrana tympani be also destroyed; also cases with septic secretion from a perforation of Shrapnell's membrane and a high degree of deafness.

(5) Granulations coming from the attic and recurring after repeated removal.

(6) Old otitis media, with adhesion of the handle of the malleus to the inner wall; extensive adhesion of the membrane to the inner wall, or of rigid calcification of the membrane; ankylosis of the malleus and incus, and incurable narrowing of the Eustachian tube.

Ballin would add to the above list (Politzer's) some cases of chronic catarrhal deafness in order to improve the hearing and relieve the tinnitus.

Neumann uses equal parts of a one per cent. solution of cocaine and adrenalin (1-1000) for local infiltration. The patient is seated in the ordinary way and the meatus cleansed with lysol and ether. The injection is made with an angled hypodermic syringe into the upper wall of the canal at the junction of the membranous and bony portions. The fluid is injected slowly till the part assumes a bleached appearance. After waiting from five to ten minutes the operation is commenced.

Two incisions are made in the membrane with a small, straight, tenotomy knife, one in front of and one behind the hammer as far up as the sulcus tympanicus. If the membrane is present and almost intact an incision is made round the periphery and the membrane removed. The chorda tympani is often divided, but this is of little consequence.

Delstanche's ring knife is then passed round the detached hammer and moved upwards so as to divide the tensor tympani

tendon. If the hammer is adherent to the inner wall it must first be separated with an angled tenotomy knife. The malleus is then grasped and shaken in order to loosen it, and finally drawn down with Sexton's forceps into the lower part of the tympanic cavity and removed through the meatus. Care must be taken not to break the hammer during this process.

The incus is next removed with Zermi's incus hook or Neumann's incus spoon. One of these angled instruments is introduced vertically into the attic and rotated backwards and downwards 90 degrees to bring it in contact with the body of the incus. Further downward pressure causes the incus to drop into the lower part of the tympanic cavity, to be finally removed with forceps.

In some cases it is advisable to remove the external wall of the attic with a chisel after detaching the epithelium covering the meatal roof at this part.

Finally the cavity is syringed out with lysol—boric acid powder is insufflated and sterilized gauze is packed into the tympanic cavity and meatus. The after treatment is similar and may last from two to four weeks.

The dangers of the operation are :—

(1) Facial paralysis.

(2) Temporary loss of taste on one side of the tongue.

(3) Headache, dizziness, vomiting and deafness, due to injury to or dislocation of the stapes. Such symptoms may last weeks or months and finally subside.

Ballin gives a short account of five cases. The discharge ceased in all and the hearing distance was improved in three out of the five.

The patients operated on by this method felt no pain, and stated that they only heard the instruments in the ear. The operation, however, is not suitable for children.

All the cases operated on were suffering from middle ear deafness and had no disease of the inner ear or auditory nerve. The operations lasted from twenty to thirty minutes.

Ossiculectomy appears to furnish us with a half-way house in the treatment of chronic suppurative otitis media. In the first place we have antiseptic syringing, the use of hydrogen peroxide drops, intratympanic syringing, removal of granulations, polypi, etc. On the other hand we have the radical mastoid operation with its excessively long and painful after-treatment. If syringing, etc., fails to cure the chronic discharge ossiculectomy should be tried, provided that the case be suitable, and, if this fails, we may be almost certain that there is disease of the temporal bone and that the radical mastoid operation is called for.

New Books and New Editions

Manual of Anatomy, Systematic and Practical, including Embryotomy. By A. M. BUCHANAN, M.A., M.D., C.M., F.F.P.S. (Glasgow), Professor of Anatomy in Anderson's College, Glasgow; Examiner in Anatomy for the Triple Qualification of the Scottish Licensing Bodies, etc., etc. Vol. i., Osteotomy: Upper Limb, Lower Limb. With 268 illustrations, mostly original, and in colours. University Series. London: Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden. 1906. Price 12s. 6d. net.

WITH the second volume, which is to be published shortly, this manual of anatomy will be completed. The work aims at rather more than the title implies, for it is the author's intention to make the manual complete as regards all the student's requirements. It is to serve as a systematic text-book, and at the same time is to be used as a practical handbook in the dissecting-room. The object is achieved by inserting as an appendix, as it were, and in small type, guides to the dissection of the region described in the text. Advantages may be claimed for such a combination of the systematic and practical teaching of anatomy, but we think the method adopted by Professor Buchanan does insufficient justice to the practical part. There is more in practical anatomy than mere dissection. Surface and surgical anatomy are so closely connected with it, that the student's interests are better studied by a fuller and more comprehensive treatment in a separate work.

Only the first volume is at present under consideration. It deals with Osteology and the general anatomy of the extremities, and constitutes a handsomely bound volume of some 600 pages, of convenient size, well printed and illustrated.

Practically half the volume is devoted to the consideration of the bones. They are dealt with at ample length for the student's needs. The development and ossification are shortly alluded to, and careful attention is paid to preciseness in anatomical description. In the latter connection, a useful introductory survey of descriptive terms used in the description of bones in general is given, terms of very considerable importance to the student, the exact meaning of which he is often left to find out for himself as he goes along, and of which he is apt to form erroneous impressions. The joints are rightly dealt with in the region in which they occur.

The work is exceedingly well illustrated. The exact origin

and insertions of muscles are clearly demonstrated with the use of red and blue colours, while in the dissections, vessels and nerves are coloured. The majority are specially drawn, and are reproduced with much artistic skill.

Judging from our perusal of the first volume of this work, which is gracefully dedicated to Sir Joseph Lister, we can thoroughly recommend it to the student, who does not wish one of the larger anatomical manuals, as a work sufficiently full and advanced for the majority of examination purposes.

Diseases of the Rectum—being a Short Account of the Symptoms, Diagnosis, and Treatment of Some Diseases affecting the Ano-rectal Region. By F. VICTOR MILWARD, M.B., B.C., Cantab., F.R.C.S., England, Surgical Casualty Officer, General Hospital, Birmingham, etc. With 27 Illustrations, 8 of which are original and drawn by the Author. Birmingham: Cornish Brothers, Ltd., New Street. 1906.

THIS is a useful little book, dealing with the common affections of the rectum and anus: the less common are purposely omitted. It includes such conditions as hæmorrhoids, fissure, fistula, worms, carcinoma etc., and at the same time discusses the relief of constipation and the methods of making rectal diagnosis and examination. It is written on broad lines, with the object of meeting the requirements of the general practitioner; the pathology of each condition is shortly discussed, and in the treatment both the medical and surgical aspects are harmoniously blended. In connection with the former, numerous prescriptions picked from leading authorities are given, which should be found of much service. Without dealing with operative details, the surgery of these conditions is clearly and shortly presented, while the diagrams illustrate the more important instruments used for operative measures or purposes of diagnosis, and typical anatomical relations or pathological appearances.

The book has been compiled with care, and forms an acceptable book of reference and guidance in the treatment of the rectal diseases with which it deals.

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THE SCOTTISH
MEDICAL AND SURGICAL
JOURNAL

INAUGURAL ADDRESS

THE AIMS AND REQUIREMENTS OF MEDICAL EDUCATION

By D. NOËL PATON,

Professor of Physiology in the University of Glasgow

IT is not my purpose either to defend or to condemn the delivery of introductory lectures—I accept the fact that they are demanded by custom, and so, before beginning the regular work of the class, I venture to offer you some preliminary remarks.

But, first, I desire to express my sense of the very great honour which it is to be a member of the teaching body of this great and ancient seat of learning, and to say how fully I realise the responsibilities of such a post. It will ever be my earnest endeavour to discharge these duties in a manner worthy of the great traditions of this University.

I shall not at the present time take as my theme any of those subjects which are generally dealt with in inaugural addresses. It seems to me that this is not the occasion on which to attempt to give an account of the recent growth of Physiology as a whole, or of any special part of the science, because I dare not assume on the part of my audience a knowledge of the subject sufficient to enable them to comprehend the nature of these advances.

The consideration of the contributions made to Physiology by my predecessors in the Chair has attached to it the same

objection, with this further objection, that my immediate predecessor—as we all rejoice to know—is still among us. I would simply say that I am fortunate in having, as previous occupants of the Chair, two men of very different stamp, who each has in his own way shed a lustre upon Physiology and upon the Glasgow School. It can never be forgotten that Andrew Buchanan in 1845, by careful observation, well-conceived and well-conducted experiments, and by acute and logical reasoning, was able to give an account of the nature of the clotting of blood which anticipated all the important results arrived at by subsequent observers working with improved chemical methods and more elaborate apparatus.

My immediate predecessor, as I have said, is still with us. Therefore it would be impertinent for me to speak of the work which he has carried on in this University for thirty years. But I like to recall to myself and to you that he has taken a foremost place in scientific research; that he has taught, and successfully taught, Physiology for all these years to past generations of medical students, in the only way in which it ought to be taught, as a preparation for the study of medicine, as the Institute of Medicine; and last, and more important still, that his genial kindliness has helped many a "lame dog over the stile," while his high character and example has shed an influence of good throughout the University.

You all join with me in wishing him many happy years of enjoyment of his well-earned rest—a rest which we know will not be spent in idleness, but, as he told you in his valedictory address, in tasks which are altogether congenial, and which, I venture to foretell, will continue to advance the science to which he has devoted his life.

In entering upon my tenure of the Chair of Physiology, I fully realise that my chief duty is to take my part, along with my colleagues, in the training of medical graduates—in the making of the doctors of the future. And in taking up these duties and responsibilities, I am compelled to consider how they may best be discharged. You will, therefore, perhaps allow me to try to formulate some of the thoughts which have taken shape in my mind during the consideration of these questions, because I think that if teachers and students in a school can have some

common aim and outlook, and can both understand the objects and methods of their work together, that work will be accomplished by each more profitably and with greater ease.

Obviously the first question which must be considered is what we desire our medical graduates to be, what kind of men do we wish to turn out? To enable us to answer this, we must first define the purposes of the medical profession.

In its widest sense, it is a great organisation to increase the well-being of mankind, and to combat disease.

It may be compared to a State or Government with a diplomatic service to attempt to prevent the enemy from making war, and a military service to attack the enemy should war break out.

And, as we must recognise that the prevention of war is a nobler service than the prosecution of war, so we must admit that the prevention of disease is a more honourable avocation than the mere combating of disease when it has made its invasion.

In the future, it is the prevention of disease, rather than its cure, which must be the primary object of the members of the medical profession. In the older civilisation of China this is recognised in the personal relation of doctor and patient—the former being paid so long as the patient is well, and his pay stopped during illness. In our own country, while we have not yet advanced to this *personal* interest in the prevention of disease, in our capacity as members of communities we recognise this function of the medical profession in the appointment of Medical Officers of Health and in the institution of Public Health Laboratories in connection with our Universities and our Municipalities.

How is disease to be prevented? Why are we not more successful in doing so? The answer is simple. It is want of knowledge which hinders us. All our forward steps have followed and been based upon increase in our knowledge of the nature of disease and of the laws which govern the healthy action of the body and its reactions to disease.

Let us take one or two examples. Whole communities of miners and workers in other employments have frequently suffered intensely from a severe form of bloodlessness, but till the true nature of the condition was discovered it was allowed

to spread, and ineffectual attempts were made to cure it by iron, arsenic and other drugs. But when it was discovered that the anæmia was due to the presence of an intestinal parasite, it became possible to introduce proper preventive precautions by which the disease was suppressed.

Or take cholera—that once terrible scourge of the East. It was early recognised to be infectious, and elaborate precautions were taken to isolate cases and to establish quarantine, with the necessary disorganisation of trade and commerce. But when Koch, in 1884, found that the disease is due to a specific organism, and that it is propagated by the organism getting from the intestinal contents of patients into drinking-water, then the simple expedient of boiling all water used was sufficient to kill the organism and prevent the spread of the disease.

As another example, let me refer to one of the most dreadful diseases of childhood—diphtheria. For long the condition was not distinguished from other forms of sore throat. By Bretonneau, in 1821, it was defined as a distinct disease when it affected the fauces, and its infectivity recognised. But for long, when it implicated the larynx, it was classed with ordinary croup, and not regarded as specially infectious. Then came the discovery of the bacillus by Klebs in 1883 and by Löffler in 1884 and the demonstration that the malady is a definite pathological entity wherever the infection may occur, and that, by isolation, it may be prevented from spreading. Early diagnosis by clinical features alone, however, is difficult, if not impossible, and even when the use of the microscope and the application of bacteriological methods made possible a more early and certain diagnosis, the chances of infection in a family or school had often occurred and the spread of the disease was already past prevention.

But when Roux and Yersin, about 1893, discovered that, after injecting several doses of the poison of the diphtheria microbe into a horse, the blood of that animal contains a substance which not only antagonises the poison when the blood from the horse is injected into the sufferer from diphtheria, but which also so increases the resistance of healthy individuals that they can throw off the disease before it has had time to develop, it then, and then only, became possible to

prevent the spread of the diphtheria, and at the same time to offer to the sufferer a treatment far more efficacious than any hitherto attempted.

Phthisis, too, has become a preventable disease through the discoveries of Koch in 1882. That it is not a *prevented* disease is due to the ignorance and apathy of the public and of the medical profession. It is appalling to think of the loss of life, and, worse still, the misery through sickness and incapacity for work with its concomitant suffering, which has yearly to be endured, when the means of preventing these ills are simple and available.

These are examples of the way in which *knowledge* has enabled us to prevent disease. Magnificent as have been the victories, the territory conquered is but small indeed when compared with the enormous extent yet unsubjugated.

But small as the obvious results have been, the true result has been great, inasmuch as everyone has learned, or ought to have learned, that only by knowing the nature of the various morbid processes and the activities of the structures they affect can we hope to prevent them.

That terrible evil cancer stands unconquered, yearly taking its huge toll upon humanity, yearly inflicting untold suffering, because we do not *know* its nature—when that knowledge comes, as come it must, it is not unsafe to prophesy that cancer will become as preventable a disease as cholera.

The public must recognise that, if it is to have the benefits of this knowledge, it must take what part it can in gaining it. And, first, it must appreciate the fact that this knowledge, which is required to mitigate its miseries from disease, can only be acquired by investigation by an army of enthusiastic and devoted workers, who are willing to "shun delights and lead laborious days"—nay, weeks and years—in quiet, pertinacious attempts to wrest from Nature her secrets. The more we have at work, the greater the chances of success, for here, as in war, victory, to a certain extent, is to the large battalions—although, by the way, large battalions without the leadership of genius are not always successful. This, perhaps, is one reason why Germany occupies its position of pre-eminence in the spread of knowledge. Not only have her Universities, at least in the

past, offered a better training than have those of this country, but they have been more careful to retain the services of the abler graduates for the prosecution of such work. How can the public expect graduates, who have devoted five or six years of their lives to a costly course of study, at the end of that time, to give themselves to this all-important work, when they are offered either nothing, or a miserable pittance such as an assistant in a country practice expects to get while learning the money-making side of professional life? No, it is the fault of the British Universities and of the public that the advances made in the prevention of disease are not greater. And so long as the present apathy exists—and I don't for one moment expect that anything I may say will help to dissipate it—so long will our advance be slow and faltering, so long must the pain, the anxiety, the loss of work be endured.

That a certain number of men do give up, or at least risk, their prospects of gaining a livelihood in practice, or while still practising accomplish scientific work by working double time, is because they have become enamoured of the hunt after truth, which is indeed as entrancing as any form of sport, with which truly it is much akin. Its joys and sorrows are of the same kind—the difficulties to be overcome, the chances to be taken, the efforts to be sustained, and finally the joy of capture or the disappointment of failure which alike but brace the true sportsman and man of science to more determined pursuit. Yes, it is the hunting of the scalps, not the wearing of them, which delights us—and hence, if a man gives himself up to the life which he enjoys, he must perhaps put against the small income he secures, the vast sum of happiness which he has in his work. You remember what R. L. Stevenson says of those who devote themselves to literature: "They chose the primrose path; when they found it was not all primroses, but some of it brambly and much of it uphill, they began to think of themselves and speak of themselves as holy martyrs." But a man is never martyred in any honest sense in the pursuit of his pleasure.

But the public must not only give *material* support to men who are devoting themselves to its service in the

attempt to gain the knowledge required for the prevention of disease, it must also give them its *moral* support.

The medical profession knows, and they must see that the public also knows, that for the advancement of medicine and surgery experiments on lower animals are necessary. Our power of operating with safety is due to such experiments. What we know of diphtheria and of phthisis, and our power of preventing these diseases, is due to experiments on animals. And it is certain that only by such experiments can our means of dealing with other diseases be advanced.

The public gives its sanction to the painful mutilation of animals in order that they may make more agreeable food, or that they may become more docile beasts of burden, and it gives its approval to the infliction of pain in the name of sport. How dares it, then, to withhold its sanction to the use of animals for the increase of knowledge by which thousands of our fellow-beings may be saved from suffering and from premature death?

I venture to think that if the public, instead of feeding a sentimental prejudice on the gross misrepresentations of rabid agitators, would come to our laboratories and see for themselves what this experimenting really means, they would find nothing to make them shrink from giving their approval to this method of advancing knowledge. And in such a matter as this, involving, as it does, the well-being of our fellow-men, no one who throws his or her influence in the balance has any right to be ignorant of all that bears on the question. It has been well said that "Ignorance which in matters of morals extenuates the crime, is in itself in intellectual matters a crime of the first order."

Next, the public must not only be willing to adequately remunerate investigators and to give them its moral support, but it must also afford facilities for their carrying on their work by providing well-equipped laboratories. Without suitable and sufficient accommodation, and an adequate supply of apparatus, the progress of the workers is greatly hampered and their output of results reduced. That the citizens of Glasgow have appreciated this fact is shown by the magnificent pile of buildings now rapidly approaching completion, in which so much of the scientific teaching and research of the University will be housed.

I trust that, if the work of these departments grows and increases, as we all hope it will grow, the citizens will mark their approbation of the use to which their gift has been put by still further contributing to the facilities for scientific work.

And lastly, the public, in providing the means of gaining the much-needed knowledge, must recognise that they should not trammel the investigators by insisting on each research having a definite utilitarian end. It is not in this way that real advance has been or will ever be made.

Think of the work of Pasteur. It was by pure love of knowledge for itself that he was led to begin these momentous discoveries which form the basis of modern surgery—which have saved the lives of thousands—which have deprived rabies of many of its terrors, and which have so enormously increased the prosperity of his native country by overcoming the ravages of the phyloxera, the silk worm disease, and anthrax.

Hence all biological research is worthy of support, even from the most utilitarian point of view, for one never knows from what germ may spring the most stupendous and far-reaching discovery; and hence the city which most liberally endows research should reap the greatest harvest of renown.

I cannot refrain from bringing before you two examples of what seems to me a commendable method of fostering the acquisition of knowledge, two examples of a rational manner of commemorating those who have been lost to us through ignorance.

Certain curious cases of sudden death of apparently healthy children occur, in which the only abnormal condition discovered after death is a very large thymus gland. It has been called by the Germans *Thymustod.* Some years ago the child of a wealthy man died in this way, and he, instead of raising a costly tomb to its memory, appointed an investigator to inquire into the functions of the thymus, and, at the same time, gave to the Laboratory of the Royal College of Physicians of Edinburgh, in the course of a couple of years, a donation of £400 for the prosecution of investigations on the function of the thymus and other structures of the same kind. I was thus able to give a remuneration to several workers, which enabled them to devote a considerable part of their time to the work, and at the same time to defray all the cost of materials; and the result has

been that, although we have not yet discovered the cause of these deaths, we have amassed a considerable amount of information as to the exact part played by the ductless glands in the economy.

The other example I wish to quote is very similar. A man of considerable means lost his brother through inflammation in the frontal sinuses. The manifestation of his grief took the practical form of a determination to do what he could to prevent the recurrence of such deaths, and with this object he paid a trained bacteriologist to investigate the bacteriology of these upper air passages in the College of Physicians Laboratory. As a result of only a year's work, Dr Lewis has made some valuable additions to our knowledge of the morbid conditions of these regions.

I would strongly commend to the more rational section of the community such eminently intelligent methods of helping to arm us with the knowledge we require in our contest with disease.

While it is the duty of the public, in their own interest, to foster research by endowment and loyal support, it is the business of the Universities to train investigators who are competent to gain the knowledge which is necessary for the prevention of disease. And I ask myself what are the qualifications we must aim at imparting? Certainly we do not want minds stuffed with the dicta and theories of past generations—minds willing to accept and rest content in these dicta. No, the first thing necessary is a spirit of scepticism—I, of course, use the word in its true and not in its theological sense—a spirit which refuses to give allegiance to any theory, however great the name and fame of its promulgator may be, unless the evidence on which it is founded is clear and irrefutable.

But this implies the power of weighing evidence, which, to my mind, is the first essential for a scientific man, and which, alas, too few of those who can write B.Sc., or M.B., after their names, really possess.

An honest scepticism and the power of weighing evidence lead but a small way—they make only a destructive critic—unless there is the curiosity *to know*, the desire for the possession of *real* knowledge. It is this which is all important for build-

ing on the ruins of our old exploded beliefs the permanent structure of actual truth.

In order that this structure may be built up, I think that two further qualifications are wanted ; and I do not know which to put first : observation, the power of seeing things, and of seeing them as they really are, and not as we expect them to be ; and imagination—the power of clear imagery—of being able to group the observed facts to make a picture of them, and by projecting the mind forward, to see what conclusion they may lead to.

Without the power of observation, the findings upon which the conclusions are to be based will be erroneous and the conclusions must necessarily be untrue, and without imagination, the observed facts, although such facts are always of value, will not yield to their discoverer the harvest which he should expect to garner. Still, the honest collector of facts plays no small part in the progress of knowledge. He is the brick-maker who supplies the material from which the Temple of Science is built, and the stability of the fabric depends in no small measure upon the excellence of the bricks.

But I have known men, possessed by the fire of curiosity, with the spirit of honest scepticism, with the power of weighing evidence, with a well-trained faculty of observation, with no mean imaginative power, who have done nothing to advance knowledge, because they did not possess that all essential requisite, perseverance, backbone, the power of sticking to work.

I have been associated with many investigators, and the conclusion I have deliberately come to is, that, given a man with perseverance, his powers of observation may be sufficiently trained to enable him to do useful plodding work, but given a man of the most brilliant intelligence, without perseverance, all his great schemes of research will come to nothing.

The Universities must therefore strive to cultivate in those who are to take their place in the army for the prevention of disease these qualities—curiosity, scepticism in its true sense, the power of weighing evidence, the power of observation, imagination, and, most important of all, perseverance.

If our scholars can add to these the power of persuasion and tact, they may not only be able to advance knowledge,

which is their primary duty, but to have the further satisfaction of persuading the public to use that knowledge for the benefit of mankind.

But it is useless for the teacher merely to place before himself these heights to which his students are to be raised. How is he to raise them? Only, I think, by example; only by bringing the student into close relationship with men engaged in original scientific work, with men constantly exercising these faculties which he has to cultivate, with men taking their part in the advancement of knowledge. Thus only will the student receive real help in the attainment of the ability himself to take part in the advance. Hence the great importance of having active research work going on in every teaching department.

So far I have spoken of the first and highest duty of the medical profession—the prevention of disease. But, alas, our knowledge is yet far too slender to enable us always to prevent the attack. We have, therefore, to meet the enemy when he has made his advance and to attempt to rout him, or at least to mitigate his ravages.

This is what I venture to call the militant duty of the medical profession, and the first essential for success is a proper intelligence department—an adequate knowledge of the territory invaded by the enemy and of its resources, of the enemy and his resources, and of the weapons with which he is to be fought. In fact what we want is knowledge—a knowledge of physiology, pathology, and pharmacology. Without this our struggle with disease is vain. It may be "magnifique, mais ce n'est pas la guerre."

Before any attempt is made to cure the disease, a clear, definite diagnosis must be arrived at. What is wrong, and why it is wrong, must be determined.

It is no use to group together a series of symptoms under a name and to attempt to cure the patient by the remedies recommended by Dr This or Dr That. This is the notion behind the freely expressed idea that medical practice consists in pouring drugs about which we know little into bodies about which we know less. You must form a clear picture of the changed structure and altered mode of action of the organs

affected, and you must *then* consider what remedial agents may restore them to their healthy state.

I often wish that all the *names* of diseases could be abolished, and that a physician when he made his diagnosis were required to write it like a post-mortem report, stating what he considered to be the condition of each organ and his reasons for thinking so.

To make such a real diagnosis, you want not only a sound and practical knowledge of the facts of physiology and pathology, but also a training in the methods of investigating the condition and mode of action of the various tissues and organs of the body. Without this your knowledge of facts is useless. How can you decide whether the action of a patient's heart is normal or abnormal unless you know practically the methods of investigating the condition of the organ?

It appears to me that to train men for such investigations we must cultivate their power of observation, not merely through their eyes, but through their other senses as well; we must cultivate their power of collecting and weighing the observations they have made, and of deducing from them a clear picture of the condition; and, above all, we must try to cultivate a determined perseverance, which refuses to yield to difficulties, and which will carry them on till the truth lies exposed before them.

In fact, to successfully *fight* disease, we want to develop just those qualities which are required to gain the knowledge necessary for its prevention, and we should strive to turn out our graduates so trained that each is capable of adding to our sum of knowledge and of leaving his profession further on the road to becoming an art based upon real knowledge and not upon mere tradition. Look at the work of Dobie of Chester, the discoverer of so much of our knowledge of the structure of muscle; look at M'Munn's researches into the pigments in health and disease; look at the work of M'Kenzie of Burnley upon the venous pulse; at the discoveries of Murray of Newcastle in the treatment of myxœdema, and of Kennedy of this city on nerve suture. These are all men in active practice; and you, gentlemen, should not despair that you like them may have your names handed on as pioneers in medical science.

As I have indicated, we are still grievously in want of knowledge to enable us to prevent disease, and we are sorely in want of knowledge to enable us to overcome disease when it has taken possession; and for many years to come not the least important duty of the physician, if a somewhat melancholy one, must be to palliate the sufferings of the patient, and to give comfort to him and to his relatives.

Can this power of giving comfort be attained by study? Only in part, I think. The first requisite is a large, generous, unselfish nature, which is born in some and not in others, and only those who have it can become the real physicians. But the possession of such a nature without the power of observation to see what really is the trouble, and a knowledge of the workings of the human mind, which can only be obtained by prolonged study, is of comparatively little use. The more we can *know*, the more gently we shall judge, and the more charity and kindness we shall be able to show. It is a wise saying, "to know all is to forgive all," and when this knowing is accompanied by a true understanding of human nature, it is then that we are best able to throw ourselves into the position of those with whom we have to deal, and to be of the greatest service to them. Therefore, I commend to you that saying from the Proverbs, "Get knowledge, but with all your getting get understanding."

I confess that when I think of all the real physicians it has been my privilege to know, that I am filled with joy and pride that our profession is manned by such generous and unselfish men, and I cannot but think that these characteristics have been developed in many in whom they were but dormant by the intimate contact with suffering humanity which is forced upon us.

The ideal doctor is thus a man of large generous nature and of wide culture, possessed of a real love of truth and a disregard for all authority, and with perseverance to seek that truth in the face of all difficulties.

Can we hope in five years to change a schoolboy of seventeen into such a man, or even to put him in the fair way of becoming such a man after some years of further experience? The former hope is vain; the latter is alone capable of attain-

ment, provided we have men of character to work upon. That is absolutely essential, and I would deprecate the way in which parents thrust the weak-kneed and unstable members of their families into a profession which requires the most steadfast and enduring of men.

If our examinations could test the character as well as the knowledge of the candidates, the profession might be purged of many who bring discredit upon it.

But, given a boy of character, how are we to put him on the way of becoming a creditable doctor.

Certainly the mental training at school gives us little help. During his school days, the boy has spent most of his time in learning one or more of the dead languages, and in absorbing the dicta and definitions of his teachers, without being taught to consider the evidence on which they are based, or even learning that he has a judgment to exercise; and few boys have a father like the elder Darwin, who is reported to have said, "that he hoped that none of his sons would believe anything because he said it, unless they were themselves convinced of its truth." The boy has received no training in the use of his senses, and his powers of accurate observation have been left uneducated. Even mathematics has probably not been utilised as it might have been to cultivate the reasoning faculty.

I know well that all schools are not alike, and I know and rejoice to see the awakening of a true conception of elementary education, a conception which has already borne good fruit, and which will, in the future, yield a still better and more abundant harvest.

But as things are at present, we have to begin *ab initio*—we have to break down the slavish respect for authority, and foster the spirit of scepticism and independent judgment, and we have to cultivate the spirit of observing and recording honestly what is observed. This we have to do before attempting to instil knowledge, for the student must learn to acquire knowledge for himself, and not second-hand through his teachers. And, therefore, I hold that the great duty of a teacher is to educate the power of getting knowledge, and to conduct his instruction in such a way that the student will be made to learn by his own observations—supplemented, but merely supplemented, by didactic teaching.

For giving the student the necessary training, the medical curriculum, as at present planned, is excellent.

It is, as you all know, divided into three separate and distinct parts :—

1st. The preliminary sciences.

2nd. The application of these sciences to the healthy human body.

3rd. The modifications produced on the action of the body by disease and the influence of remedial agents.

These should be clearly separated, and no student should be allowed to take up the study of any part of a subsequent group until he has completed all examinations on the earlier one.

The student starts with the study of Botany and Zoology, two sciences eminently well adapted to train the power of observing and clearly recording what is observed. He then takes up Physics, and learns the application of exact methods of measurement by which to check the direct observation by the senses, while at the same time the methods and principles of experimentation are revealed to him. In Chemistry he learns the experimental procedures for working out the nature of various substances, and he masters the methods of exact measurement used in quantitative analyses.

Perhaps this idea of the reason of the position of these subjects in the curriculum is new to you. Let me say that I do not contend that they have received their place solely for the purpose I have indicated. A knowledge of the elements of the life of lower and simpler organisms is obviously of great use in the understanding of the vital processes in man ; while in dealing with so complex a machine as the human body, a comprehension of physics and chemistry is absolutely essential. These are undoubtedly the reasons which have primarily determined their position.

After this training he is fit to approach the study of the human machine with which his life's work is concerned, and he begins by mastering its structure in the study of Anatomy—a study which ought to cultivate still further his power of honest observation.

Having mastered the structure of the body, he proceeds in Physiology to study the mode of action of its different parts—to apply his knowledge of physics and chemistry to the

investigation of the action of the various organs—and he thus learns how to investigate the state of activity of each.

From the study of the structure and mode of action of the normal body, he proceeds to apply the same methods to the study of the structure and mode of action of the body under the influences of disease, and to the investigation of the action of various agents upon the activity of organs in health and in disease.

Finally, he has to apply all the knowledge and all his training in observation and investigation to the study of disease and its treatment at the bedside.

The course is thus admirably planned—but do we teachers utilise it to the best advantage?

Every teacher and most senior students, at least in the school with which I have been connected, will agree with me that there is a sad lack of co-ordination and co-operation, so that much valuable time is lost in repetitions of the same subjects by different teachers. I cannot but think that this might largely be avoided, and the whole character of the teaching improved, if the teachers consulted together—those who have to deal with the more advanced subjects telling the teachers of the preliminary subjects the special directions in which they wish the students to be trained, and every teacher unselfishly determining to instruct his students so as to fit them for their future studies, rather than to attempt to make them specialists in the particular subject taught by him.

At the same time there should be a clear consensus of opinion as to what it is desired to turn out in the full-fledged graduate, and it is for this reason that I have endeavoured to formulate what the aim should be.

It is a matter of congratulation to me to find myself among colleagues who, I feel sure, are in full agreement with the views I have expressed as to what we desire our graduates to become, and who each is so well qualified to use his particular subject so that it may serve its purpose in the development of the end desired.

But I feel that it is my duty to take *myself* to task, and to formulate as clearly as possible the objects of teaching Physiology to medical students and the methods by which these objects may best be attained.

The purpose is a simple one. It is to train students so that when they pass to the study of Pathology, Pharmacology, and Medicine, they may find themselves with a sufficiently clear and actual knowledge of the mode of action of the body in health, and of the various factors modifying it, to be able to comprehend the altered actions produced by the invasion of the body by morbid processes; and also with such a thorough and practical training in the methods of investigating the activity of the organs that they may be able to apply them to the human body for the diagnosis of disease.

With these objects in view, I have always endeavoured to begin with practical study. And in my experience Histology forms an admirable starting-point, affording as it does not merely instruction in the methods of preparing and examining specimens which will afterwards be employed in Pathology and Medicine, not merely in the attainment of a practical knowledge of the structure of the *normal* tissues, but above all, as an education in honest observation. For this reason I think that the use of text-books should be strictly forbidden. To my mind the study of Histology, text-book in the hand, with the resultant attempt to make the appearances observed fit the text-book description, is the most serious obstacle to the development of the power of honest observation. The effect of this early faulty training is most difficult to eradicate, and often persists so firmly that the senior student in his study of medicine is perpetually making an effort to force the symptoms of his patients to fit the description of some particular disease, just as he forced the appearance of the healthy organs and tissues to fit his text-book description of them.

I find far the hardest part of my task as a teacher of Histology is to induce students to see things as they *are*, and not as they expect them to be.

After such a training in Histology it appears to me that the study of Physiology may best be introduced by a few simple experiments made by the students themselves. In this way their power of collating observations and drawing conclusions from them, as they must collate observations and draw deductions in the examination of medical cases, is trained. Only after they had thus gained some such actual and real knowledge would I supplement their study by lectures.

I am firmly convinced that unless practical work precedes lectures, and that unless lectures and text-books are made to supplement and not to replace practical study, the teaching of Physiology is vain. Until the student has gained some experience of the phenomena with which he has to deal, to talk to him about them is talking in a foreign tongue which he does not understand. When he knows the real significance of the words used, when they recall an actual image to his mind, then, and then only, is learning by lectures and reading possible.

What we want is a great development of practical teaching, a development which should be made possible by the equipment of the magnificent new laboratories which we hope to occupy at no distant date.

If the teacher of Physiology can send his students on to the study of their professional subjects with a sufficient practical grounding in the facts and methods which they will afterwards require, with their power of observation, of collating the facts observed, and of forming an independent judgment upon them sufficiently trained, he should be well content, and his senior colleagues will, I think, have little cause to blame him.

Have I spoken too exclusively of the duty of the teacher to the student? Is it not rather my business to speak to you students of your duties? Well, I confess that I have little faith in preaching. I believe in example more than in precept, but I trust that in lecturing myself and your teachers generally, I have succeeded in helping you to realise what you should desire to attain, what you wish to become.

To make yourselves good physicians is to set up a high ideal, and to help you to reach it, it is well to

> "Image the whole, then execute the parts,
> Fancy the fabric
> Quite, ere you build."

Remember that it is your high privilege to take part in the struggle to prevent disease, and to increase the health and efficiency and happiness of the people, to fight disease when it is there, and to give comfort and consolation to very many whom you can help in no other way.

Keep before you what your training must be for these

three great objects—your powers of observation, your reasoning faculty and independence of judgment, your perseverance and determination in the face of difficulties, must all be cultivated and strengthened. Remember that you must not only get knowledge, but also get understanding. That you must aim at cultivating what the author of "Rab and his Friends" so well describes: "That general strength and soundness of understanding, and that knack of being able to apply your knowledge instantly and aright, which must ever constitute the cardinal virtue of a great physician, the very pith and marrow of his worth."

Your understanding should give you the true charity which enables you to appreciate the outlook of those with whom you come in contact, to comprehend the way in which their surroundings affect them, and to sympathise with them.

To keep your sympathies wide you must be something more than doctors. There is a very real danger in the concentration required in medical education narrowing the outlook on life and stultifying the wider interests. And it is the possession of these wider interests and wider sympathies which often makes the doctor the greatest helper of mankind. For this reason you should make your recreation during your medical curriculum the study of literature in its widest sense—of history, biography, philosophy, and poetry, and you should ever widen your relations to the universe and to your fellowmen by taking all that is best from all sorts and conditions of men. Try, then, for your own sakes, and for the sakes of those with whom you will be brought in contact in your after life, to be cultured men as well as able doctors.

ON TRANSITORY HEMIPLEGIA IN ELDERLY PERSONS

By F. H. EDGEWORTH, M.B., D.Sc.,

Physician to the Bristol Royal Infirmary, and Professor of Medicine, University College, Bristol

IN a recent number of this Journal,[1] Dr Langwill described two cases of transitory hemiplegia, and advanced the theory that the condition is due to "a temporary arterial spasm involving a portion of the central vascular supply."

The following notes of two somewhat similar cases, which have been under my own care, are recorded as a contribution to our knowledge of an interesting and obscure disease. They show that phenomena due apparently to temporary arterial spasm in the cerebral circulation may assume forms other than hemiplegia, and that physical signs are present in the hemiplegic cases whereby the condition can be diagnosed during an actual attack and a correct prognosis consequently made.

A short, very muscular, and very stout gentleman of sixty-eight years of age came under my care in November 1901, suffering from an attack of influenza, which was followed by symptoms of heart failure—dyspnœa on exertion and a slight amount of œdema of the legs. No abnormal physical signs were found on examination of the chest or abdomen. These symptoms improved on the administration of strychnine, and by the middle of December he seemed fairly well again. On December 28 he suffered from a "faint" (as I was told), which was followed for two days by childish talking and behaviour.

On January 19, 1902, he awoke, after a good night's sleep, at about 8 A.M., and at 8.30 had some twitchings of the left side of the face, left arm, and left leg, with (?) loss of consciousness, which were immediately followed by a left hemiplegia. The mouth was drawn to the right, there was loss of power on the lower part of the left side of the face, and he could barely close his left eye. The left arm and leg were paralysed and flaccid. The elbow-jerks were not obtained, the knee-jerks were present and equal, no ankle clonus was obtained.

[1] Vol. xviii. p. 509.

Unfortunately I did not test the plantar reflexes. Skin sensibility was intact. The mental condition was normal. Nothing wrong could be found in the heart. The pulse was of moderate tension and regular in rate, seventy-six per minute.

The paralysis began to lessen at about one o'clock the same day, and by 4 P.M. was quite gone.

On January 24 he had a similar attack, which began and passed off at about the same hours as had the previous one.

On January 28 the patient woke at 4 A.M., a little dyspnœic, and immediately began to talk and act very strangely. He said he wished to go for a drive round the Downs, and went out in the garden in his night-shirt in the pouring rain to, as he said, call a cab.

Subsequently he allowed his wife to partially dress him on the doorstep, and sat in the garden to wait for the cab. He was so strong muscularly that he could not be forced to enter the house. His pulse was regular, one hundred per minute, and of moderate tension, and no paralysis was present. I persuaded him to at least come into the hall of the house, and there he sat and had breakfast at about 6 A.M.

By about 11 A.M. his mental condition was better and he was induced to enter the house. By 3 P.M. he was himself again, all delusions gone, and very apologetic for the trouble he had caused.

Bronchitis supervened as a result of this exposure, failure of the heart occurred, and he died on February 15, without having had any further attacks either of mental derangement or of hemiplegia.

The second case was that of a man, aged sixty-four, who was admitted to the Bristol Royal Infirmary on May 26, 1906. He was said by relatives to have had an attack of unconsciousness, lasting twenty-four hours, seven years previously. He had been slow and dazed for the week previous to admission, and especially so on the morning of the 26th when preparing for his day's work. He went out, and was seized with a "fit" on the street at about 9 A.M., and was brought in by the police. In the Casualty Room it was found that he was unconscious, and suffering from clonic spasms of the left side of the face, left arm, and left leg. The temperature was 101.8°, pulse 140 per minute, respirations 40. He was slightly cyanosed. He was

admitted to my ward. There the clonic convulsions gradually subsided, and disappeared at about 11.30 A.M.

At 2 P.M. he was observed to be semi-conscious, with a flaccid paralysis of the left side of the face and tongue and left arm. The left leg was also paralysed, but with some adductor spasm of the adductors and of the extensors of the foot. The elbow-jerks were absent. Both knee-jerks were present and active, the left one being a little sharper than the right. No clonus was present. The plantar reflexes could not be obtained. The temperature in the left axilla was 98.6°, in the right axilla, 97.8° ; the pulse-rate was 72 ; respirations, 12 per minute. The radial arteries were atheromatous and tortuous, and the vascular tension was moderate. The chest was emphysematous, and there was no appreciable cardiac dulness on percussion. The cardiac apex was in the fifth space in the nipple line, and there was a faint systolic apical bruit.

In the course of the afternoon the patient recovered, became fully conscious, and regained complete use of the left side of the face and tongue and of the left arm and leg.

The difference in temperature between the two axillæ grew less and disappeared during the second day. The urine was found to be slightly albuminous on the day of admission. This trace disappeared on the next and did not reappear. The quantity of urine varied, during his stay in the Infirmary, between 30 and 40 ounces, and its specific gravity between 1016 and 1020.

On June 1 the patient had a second attack at 3.45 A.M., lasting a quarter of an hour, in which he became unconscious, passed urine in the bed, and had clonic convulsions of the left arm. He was not paralysed afterwards. On June 2 an attack occurred at 4.3 A.M., precisely similar to that of the previous day.

On June 12, at 6.20 A.M., there was an attack in which the senses were lost and urine passed, and in which both arms and the left leg were affected by clonic convulsions. This lasted five minutes. He was not paralysed afterwards. At 7.3 A.M. he had another similar attack. He was rather silly and childish in his talk during the remainder of the day.

No further attacks occurred, and the patient was discharged

on the 21st of June. Up to the present date (August 18) he has remained quite well.

Before discussing these cases further it may be remarked that the second case presented features somewhat resembling Jacksonian epilepsy. There was, however, no history of headache or vomiting, and the optic discs were normal. The clonic convulsions lasted far too long, *e.g.* in the first attack for two hours, for the attack to have been one of ordinary epilepsy, in which the duration of clonic spasm is not more than a few minutes.

The phenomena presented by this patient had a close resemblance to those shown by the first, viz. clonic spasm followed by a transitory paralysis. The differences between them are that in the second case, unlike the first, attacks occurred which were not followed by paralysis, and also one in which both arms as well as one leg were affected. Further, the second case did not have any attack of mental derangement only. The most probable theory to account for these phenomena is that of spasm affecting the cerebral vessels, as advanced by Dr Langwill. I need not repeat his arguments that hæmorrhage, embolism, and thrombosis are all extremely unlikely.

In his two cases the attacks consisted of hemiplegic paralysis only, not preceded either by loss of consciousness or by clonic spasm. But the occurrence of these phenomena is a priori not at all unlikely, for Schiff,[1] by compression of his own carotid, produced clonic spasms of the opposite side of the body, preceded by a sense of numbness and formication, and Leonard Hill found clonic spasms in the hand. The "first effect on applying compression was a sensation in the eye on the same side; then there followed a sensory march of formication down the opposite side of the body. This began in the fingers, spread up the arm, then down the leg. Finally, clonic spasms of the hand occurred, accompanied by an intense feeling of vertigo and alarm."

The initial occurrence of loss of consciousness and clonic spasms in the subsequently paralysed parts are thus probably due to the same cause as the paralysis. And clonic spasm not

[1] See "The Physiology and Pathology of the Cerebral Circulation," by Leonard Hill.

followed by paralysis—as in some attacks in the second case —admit of the same explanation.

The occlusion of the cerebral arteries is, as shown by the speedy recovery, not absolute. It is in harmony with this that the plantar reflex in the second case—the phenomenon was unfortunately not looked for in the first case—did not become of extensor type. Indeed, no plantar reflex could be obtained, probably owing to temporary exhaustion, as in the case of epileptic fits. This absence of an extensor plantar reflex affords a ready means of diagnosing the condition from one of hemiplegia due to some organic cause, where the reflex becomes of extensor type within a very short time.

The occurrence of transitory mental derangement in the first patient without spasm, or loss of consciousness, or paralysis, was probably due to the same cause as the attacks of hemiplegia, though, perhaps, the occlusion was more widespread and less pronounced. Similar cases have been published by Russell.[1]

I would venture to draw the following additional conclusions in regard to this class of case :—

1. In elderly persons attacks of transitory hemiplegia may occur, which are probably not due to any persisting vascular lesion. The hemiplegia may or may not be preceded by loss of consciousness or clonic spasm in the subsequently paralysed parts. Or clonic spasm may occur which is not followed by paralysis.

2. If paralysis occurs it can be distinguished from that due to a permanent vascular lesion by the non-occurrence of an extensor plantar reflex.

3. In such patients, attacks of mental derangement, of similar transient character, may occur ; they are probably due to the same cause.

[1] *Practitioner*, March 1906.

Clinical Record

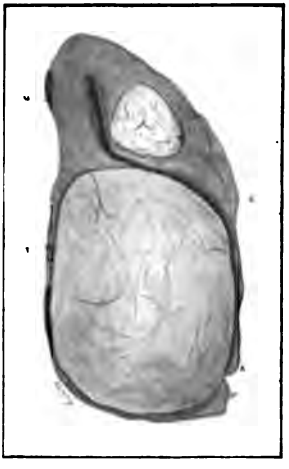
A CASE OF FIBROID OF THE CERVIX UTERI

By A. LOUISE M'ILROY, M.D.,
Assistant to the Surgeon for Diseases of Women, Glasgow Royal Infirmary, Assistant-Surgeon, Glasgow Lock Hospital

THE following description of a fibroid of the cervix uteri may be of interest, owing to the comparative infrequency of this condition. The specimen closely resembles one reported by Mr W. A. Meredith in the *Transactions of the Obstetrical Society of London*, vol. xlvi., 1904. The patient, aged 56, multipara, had suffered from metrorrhagia for three years, and had later on marked pressure symptoms, the catheter having had to be passed for several weeks.

The operation was that of abdominal hysterectomy, and I had considerable difficulty in raising up the tumour, the lower part being tightly wedged in the pelvis.

The *specimen* consists of uterus and appendages, with a large fibroid tumour of the cervix, the whole weighing $3\frac{3}{4}$ lbs. The uterus is lying on the summit of the tumour. The uterine walls are somewhat thickened and fibrous in character. In the anterior wall are two small myomata about the size of a pigeon's egg, and soft in consistence.



The endometrium is thickened, and shows evidence of hæmorrhagic infiltration. The Fallopian tubes are normal; both ovaries contain small hæmorrhagic cysts.

The walls of the cervix are thinned out in its entire length by an oval tumour which measures $5\frac{1}{2}$ inches in length and 19 inches in circumference at its thickest portion. The tumour, which can be easily separated from its capsule, causes distension of the external os uteri to about the size of half a crown, but does not protrude through it. The lips of the os are thickened, granular, and are tightly stretched over the tumour at its lower portion and on its anterior aspect.

The cervical canal is with difficulty made out, but is found lying in front of the tumour mass, the anterior wall of the cervix

being closely applied to it. The tumour is entirely embedded in the posterior cervical wall.

The canal measures 6 inches in length, the uterine cavity being 2 inches, and in the opposite direction forming a curve like the letter S.

There is no evidence of the tumour having had its origin in the lower uterine segment or pelvic connective tissue.

On microscopical examination, the tumour is composed of dense fibrous tissue which in places shows signs of necrobiotic degenerative change, no muscular or glandular tissue being present.

The accompanying drawing is taken from the interior of the specimen after it had been hardened and one-half removed.

A MODEL TO ILLUSTRATE SEVERAL OF THE CLINICAL FEATURES OF HIP-JOINT DISEASE

By W. KELMAN MACDONALD

NOTE BY MR CATHCART

Mr W. K. Macdonald's model for illustrating the deformities produced by Hip-Joint Disease is so valuable in making clear the mechanism of the condition, and at the same time so simple in construction, that I have asked him to publish a description of it.

Students find it difficult to understand the true meaning of apparent shortening, apparent lengthening, and lordosis in hip-joint disease, but in ten minutes a demonstration with this model will make the difficulties plain. A little further personal practice with the model will be required, and after that the student is in a position to appreciate a clinical demonstration and grasp the points at once.

THIS model is a wooden representation of the spine, pelvis, and lower extremities. It is made from the following materials :—

(1) A bar of wood one inch broad and forty-four inches long.

(2) Four hinges with screws.

(3) A piece of rubber cord two inches long.

(4) A stout wire six inches long.

Six pieces, each six inches long, are cut off from the bar of wood; the remaining piece will be eight inches long, and is required to represent the pelvis. To represent each lower extremity, two of the six-inch pieces are joined together by a hinge, which represents the knee-joint, as is shown in Fig. 1. The remaining two six-inch pieces are joined together by the piece of rubber cord in the following manner. A hole large enough to admit the rubber cord is bored an inch longitudinally into the end of one of the pieces. When the rubber cord has been inserted into this hole, a little plug of wood is removed from the under surface of the wooden bar one inch from the bored end, and by this means the end of the rubber cord is exposed lying in its groove (see Fig. 2). The end of the cord is seized and firmly fixed by aid of a piece of string and a screw. The plug of wood can now be replaced, or the hole can be filled up with putty.

Fig. 1.

About one inch of the rubber cord will now be seen projecting from the end of the piece of wood, and into the second

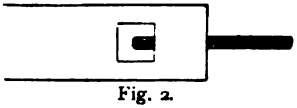


Fig. 2.

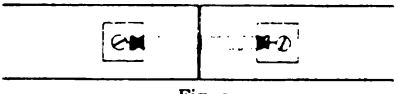


Fig. 3.

piece of wood this cord is inserted and fastened in a like manner, due care being taken to put the cord slightly on the stretch, in order that the two pieces may be held in close apposition end to end, as shown in Fig. 3. These two pieces, thus joined together, represent the spine, and are firmly fixed to the pelvis piece, a notch being cut out of the centre of the latter to admit of the neat attachment of the former. This is shown in Fig. 4.

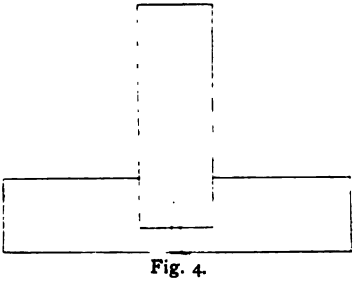


Fig. 4.

It is now necessary to fix the thigh to the pelvis piece by a joint, from which the movements of flexion, extension,

abduction, and adduction are obtainable. These circumductory movements can be obtained from a simple hinge joint by the following contrivance. The hinge must present either three holes for screws in each side, or if there be only two holes, the holes must be placed one behind the other, and not side by side. The upper end of the piece, which represents the thigh, is then made pointed, or rather wedge-shaped, as shown in Fig. 5. To this wedge-shaped end one side of the hinge is fixed by a screw, and this screw (1) must be the only screw attaching the hinge to the thigh piece, and (2) must not be tightly screwed in, for it has to act as a pivot round which the movements of abduction and adduction are obtained. The other side of the hinge can then be fixed to the end of the pelvis piece firmly and after the ordinary manner. The movements of flexion and extension are obtained at the hinge joint itself, the abduction and adduction are obtained by the single loose screw which is inserted into the thigh piece acting as a pivot; while a combination of these movements gives the circumduction which prevails at the hip-joint. This contrivance, therefore, represents the hip-joint, and is shown in Fig. 6.

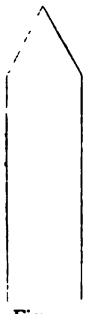


Fig. 5.

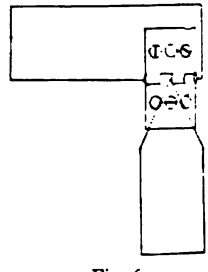


Fig. 6.

It is now necessary to fix this hip-joint in the various positions which, as is well known to the surgeon, the thigh assumes in hip-joint disease. This is done by inserting a stout wire through the pelvis piece into the thigh piece while the latter is in the position (1) of flexion, (2) of abduction and flexion, (3) of adduction and flexion.

The wire is heated red-hot, and is driven through the pelvis piece, well down the long axis of the thigh piece, while the latter is in a position of slight flexion. The wire is withdrawn, and when again placed in the hole it has burned for itself the thigh will at once assume the position of slight flexion which it was made to maintain during the process of burning. The wire is again heated red-hot and inserted

through the pelvis piece downwards in an oblique direction and from within outwards into the thigh piece, while the latter is in a position of abduction and flexion.

A third hole is burned through the pelvis piece into the thigh piece obliquely downwards and from without inwards in a similar manner, and so that when the wire is again inserted the thigh takes up the position of adduction and flexion. Fig. 7 shows the completed model, with the thigh fixed in abducted position.

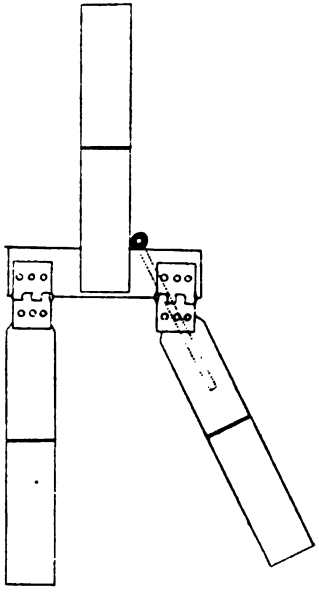


Fig. 7.

It might perhaps be advisable to first of all burn a hole along the entire length of the thigh piece in the direction of its long axis, but this would necessitate a considerable amount of care, in order that the subsequent burnings through the pelvis piece might open out exactly opposite the hole in the thigh piece when that piece was in the various positions.

In addition, it might be so arranged that this joint, or preferably the joint at the other side, might be rendered capable of assuming a position of extreme flexion, in order the better to demonstrate the compensatory lordosis, but more especially Thomas's test for hip-joint disease, the reliability of which is well shown by this model.

The model also explains and demonstrates the cause of the apparent lengthening, the apparent shortening, as well as the lameness, the compensatory lordosis, and the lateral curvature of the spine, first in one direction and then in another, all of which are recognised as clinical features of hip-joint disease. The model clearly shows that these "clinical features" are simply the mechanical effects of the fixation of the hip-joint in certain positions.

THE EDINBURGH POST-GRADUATE COURSE OF 1906

Some Friendly Criticisms by one of the Post-Graduates

NOW that it is over, no one will deny that on this, the third time of asking, the special post-graduate course has been a great success.

From all accounts everyone has been agreeably surprised at the number of graduates attending, except, curiously enough, some of the said graduates who had looked forward to small cliniques and personal work and diagnosis. But the cause of the large attendance is not far to seek, for the very terminology of medicine has changed within recent years, and knowledge bright enough at the start soon rusts, not so much from disuse, as from the oxygen of new ideas and thought. The lecturers certainly vied with each other in giving the very best they could; and if they were willing to give, the graduates were equally willing to receive, and that right thankfully. That some lectures were better than others goes without saying, for while many lecturers were veterans when we were yet students, others were only fighting for their spurs. The writer in no way desires to pick holes in any details—the rather otherwise—for criticism is the essence of final success. Dr Byrom Bramwell's idea enunciated at the Inaugural Address is eminently capable of literal fulfilment, namely, that the Edinburgh post-graduate course should become international and a rival to Vienna. But in order to attract men from such a wide sphere as even America, the greatest names must adorn the list of lecturers, men already known by their works and writings. Some have commented somewhat critically on the fact that so very few of the University teachers have taken part, leaving all the honours to be gleaned by the extra-mural teachers. Possibly that may be remedied now that the organisers have some definite figures to go upon. It is understood that about seventy-two men were attending.

Most of us soon began to complain of brain-fag, perhaps because our minds have got out of the habit of hourly lectures. At any rate, 9 A.M. to 6 P.M. was far too much, and if the hours were from 9 or 10 A.M. to 3 P.M., most would feel that they were getting good measure, while the whole time of the course might be lengthened to four weeks.

It may seem somewhat of a bold suggestion, but to meet this difficulty let *each* subject be dismissed in *one* week. Say a group of four or five kindred subjects taken together in one week, each day being a replica of its fellow. This would enable each lecturer to finish in one week the work which this year

took him three. Likewise it would be a material help to those who, wishing to take out but (say) three subjects, might not have to stay up for three weeks to do so, but would have to stay for just so long as suited them. Many can leave their work for a week or two, not many for a month. These advantages might be amplified, *e.g.* as where partners might arrange for each to attend alternately. Besides, the item of expense comes in very largely, for it must take nearly £25 to £30 for the course when a *locum tenens* has to be paid.

The cliniques were oftentimes too large. If there were two or three cliniques on the same subject at the same hour by different lecturers, it would permit of more personal and friendly relations between students and teachers, and of greater facilities at the bedside.

Oftentimes one wished to ask questions at the end of the lecture, but the next hour pressed, and the questions remained unasked. Might it not be understood that the lecture should only be 50 minutes, and that 15 minutes should be spent in a sort of conversazione; making 1¼ hour to each subject? The more conversational a clinique is, the better for the graduates.

It has presumably been a difficulty with the committee to know the experience of the men attending At two different cliniques of twenty-four, no less than sixteen men had grey in their hair, and only one looked as if he were recently "thro'"!

But to return to the practical. In some such subjects as bacteriology and hæmatology, some had already made the subject their own and these would have liked an advanced course. The course in bacteriology was excellent, for those who had never stabbed a tube or stained a coccus.

It would be invidious to distinguish the individual lectures, but as a rule any subject that was practical and able to be demonstrated clinically was the better success, *e.g.* "Skins," which was purely practical and clinical, compared with "Anæsthetics," at which one saw no anæsthetic given, not even ethyl chloride (at any rate not at the first two cliniques; the writer was unable to attend the third, as the hour was changed).

It was a distinct pity that two such subjects as "Sick Children" and "Ears" should be dealt with at the same hour, for both are everyday subjects in general practice. Neurology had the premier honour of a 10 A.M. class; but while neurology is interesting to the average practitioner, still he would prefer something less of the "interesting" and more of the "daily."

Examination of urine was very useful indeed, but it would have been better for every pair of men to have done their own tests.

There is doubtless many another criticism to be offered, and

these criticisms criticised. But brevity is the soul of a good many other things than wit.

To sum up these suggestions:—

1. Small cliniques, not more than 20.
   Remedy—more lecturers.
2. Short hours. 9 A.M. to 3 P.M. or 10 A.M. to 4 P.M.
3. Four weeks' course.
4. Any one subject to be disposed of in one week.
   Advantages—(*a*) to lecturer; (*b*) to graduate.
5. Each lecture to be 50 minutes, and 15 minutes for conversation, etc.
6. Junior and senior courses in bacteriology and hæmatology.

MEDICAL TEACHING

THE TEACHING OF MEDICINE IN EDINBURGH

IT is impossible to consider this subject without saying a word or two as to the teaching of the sciences, such as chemistry, anatomy, and physiology, which lead up to the teaching of medicine. The physician cannot, of course, be present at the training of the students in these sciences, he can only judge of the results as he sees them when the student comes to apply his knowledge at the bedside. Speaking broadly, one must gather from this test that the tendency of the purely scientific teachers is to teach their subjects too much as pure sciences, and not to bear in mind sufficiently the relation of the scientific facts to the use which is ultimately to be made of them by the man who is learning them. Take anatomy, for example. Everyone will grant that it is impossible for the student to be taught too much anatomy. Details of nerve supply, of muscular insertion, of vascular anastomosis and so on, which appear uninteresting enough may at any moment become of vital importance, to a surgeon in particular. But from the physician's point of view the most constantly important part of anatomy is the relation which organs bear to the surface, and one hardly ever finds that students have more than the vaguest ideas about this. They will give you the course and branches of the sciatic nerve, but they cannot put in the outline of the stomach with a paint-brush. It may be said that it is the duty of the physician to teach them this, but with the constant refinement of diagnosis that is going on, the physician has little enough time to overtake his own work without having to supply the omissions of someone else. It is maddening to get well under way in a clinique on a case of enlargement of the liver, and then to find that some

of the men to whom one is talking do not know the size and shape of the normal organ. In the same sort of way there are some parts of physiological teaching which are of importance to the study of medicine, others which are not. Histology must be taught minutely, for it is impossible to form an accurate mental picture of pathological processes unless the normal structure of organs is thoroughly familiar, and no one can become a competent clinical microscopist without thorough histological knowledge. On the other hand, many of the results of experimental physiology are not of primary importance, and it seems a pity to waste the time of the heavily-burdened student by making him learn them, or repeat them experimentally for himself—except in so far as the experiments may give him neatness of manipulation. The broad facts of the great functions of the body, which are all that most practitioners ultimately keep in their minds, are apt to be lost sight of in the multiplicity of detail.

One sometimes hears from teachers in other schools that our clinical material here is insufficient for our large number of students. That is not the case; if it were so, the students would soon find it out, and would go elsewhere. The material is ample, but in certain directions it might be better utilised. The demand for beds in the Infirmary is so great that only serious cases are admitted, and of these, and of teaching upon these, there is no lack. But our teachers, and our students following in their wake, do not seem to me sufficiently to realise that the lives of practitioners are not spent in seeing interesting and rare cases, but largely in treating minor ailments, which are seldom seen in hospital wards. A clinical lecture on acromegaly commands a large and interested audience, but a lecture on headache would probably be sparsely attended unless a call for "cards" were anticipated. The medical waiting-room could easily supply this deficiency, but it will never be properly taken advantage of by students while the assistant physicians have to teach in a badly lighted, badly ventilated cellar, where only the students in the front row can see what is being done.

In this school, where there are seven teachers of clinical medicine in the Infirmary, any of whom male students may attend, each man has his strong points, and each, possibly and presumably, his weak points; but it is far too common for students to attach themselves to one teacher throughout their course. There are various and sometimes obvious reasons for this, but it is a pity that it is not made easier for men to get the best from all the teachers. Our clinical lecture system is of some value in this direction, but does not go nearly far enough.

It has always seemed to me a terrible waste of energy and time that all the lecturers in systematic medicine should go on year after year, grinding out their hundred lectures, through subjects in which they are interested and subjects for which they care little. Individual enterprise is an excellent thing, and it is doubtless a good thing for the lecturers that they are compelled to keep themselves up to date in all branches of medicine, but it would be infinitely better for the student if the lecturers were allowed to co-operate, and if each man were to teach only those branches in which he is an acknowledged authority. Our teachers are so numerous and so diverse in their special subjects that it would be quite easy to arrange a co-operative course in which each branch should be taken up by a man of wide reputation. The students would gain by this, and the school as a whole would certainly not lose. This method has already been tried with great success in some non-qualifying classes, and there is no reason, except the difficulty of obtaining recognition from the Universities, why it should not be tried in qualifying courses also. Of course it could not be done within the hundred lecture limit, but that difficulty could easily be surmounted.

It is a common complaint among practitioners that young graduates, not of Edinburgh specially but of all schools, when they become assistants, are of little use in practice for the first six months, for the reason that they know how to treat disease but not how to treat patients. Some men quickly pick up the knack of dealing with their fellow-creatures, others gain it slowly and with difficulty. I have often heard doctors regret the disappearance of the old system of pupilage. In this respect the Scotch schools have an advantage because of the dispensary system. That is one of the most valuable items in our curriculum, and should be fostered and extended as much as possible. Though the patients are humble and do not require to be dealt with so circumspectly as wealthier people, a student who is interested in his work will always try to do his best for them, were it only to save his own self-respect. He is thrown largely on his own resources, without the artificial aids which he has in hospital, and I have always found that the students on whom I could place most reliance when I was a dispensary doctor were the men who did best in after life, and were the men who most quickly appreciated the realities of practice.

One other point may be mentioned, and that is the want of teaching of medical ethics, for students are sent out with no notion other than what they can pick up from casual talk, of the relation of practitioners to one another, to consultants, and to

the general public. What wonder, then, if young men in a hurry undersell, allow themselves to be sweated by clubs, and do all those things which move their brethren to wrath? The wonder is rather that under the stern push of necessity the young men keep so straight as they do. A few lectures on all these points, given by the man most competent to deal with them, would not only lessen the labours of the General Medical Council, but might sweeten professional life, and prevent the petty jealousies that sap half the usefulness of the profession.

THE TEACHING OF CLINICAL MEDICINE

THE following jottings are meant to describe in a somewhat brief and incomplete way the ideal method of teaching Clinical Medicine, the plan that I would have carried out if I were free in my capacity as a lecturer to do the best I could for my students. Certain difficulties which at present exist could be easily overcome by financial aid; others, such as are inherent in the student nature (and, alas! one must sorrowfully confess, in the teacher's nature too), are worse to get over. The course of Systematic Medicine is, I suppose, still indispensable, though it will be admitted that it is taking more of a secondary place as the years go by. Few clinics, if any, in this country are large enough to provide examples of all the forms of disease native to Britain, not to mention the ever-growing class of tropical and other foreign diseases. Hence completeness of instruction and system in conveying it, the demonstration of the family relationships between types of disease, demand regular professorial work, and I do not believe in substituting for this a tutor with a text-book. Nevertheless, system might guide clinical instruction to a greater extent than is the case now, speaking generally. I refer specially to care in selection of cases which will give the student a purview of all the various systems in the course of a session. On the other hand, many must be taken whenever opportunity offers. Thus acute or moribund or rapidly changing cases, many forms of nervous disorder, cases that are anxious for one reason or another to get out soon—all these of necessity interfere with system. It is usually possible as the session wears on to refer back to such in connection with fresh studies.

Students should at the outset be forcibly impressed with the shortness of the time at their disposal for learning clinical medicine. Two years is long, except in retrospect. It is a painful sight to observe a student wasting his first session in the medical wards, coming irregularly, taking no notes, sitting with

dreamy gaze, expecting to acquire knowledge without effort, mis-using his liberty. So all legitimate means to prevent this abuse, and to rouse interest, should be invoked.

It is a decided advantage that juniors should be taught apart from seniors. Clearly the latter ought to be quite familiar with vast numbers of facts that must be dinned into the heads of the juniors, and it is rightly regarded as unwelcome drudgery and waste of time that the senior should be compelled to go over again the ground he has traversed with painful steps and slow, in his first year. In some schools we find a natural adjustment to these conditions; some lecturers are preferred by juniors, others by second year's men. There are diversities of gifts, and Admirable Crichtons do not grow as thick as autumn blackberries. With a little frank consultation and compromise the path of the student in this matter of choosing a teacher might be defined, to the great advantage and comfort of teachers and taught. With beginners, for the first few weeks at least, the mind is apt to be rather muddled; hence it is well to use well-marked cases in which no very profound difficulties occur, or at least to emphasise the leading features, frankly avoiding side issues or disputable points for the time. I do not mean that the case should not be completely taken; on the contrary I think it of the utmost importance that the student in whose charge it is should spare no effort under the guidance of the house-physician to make it complete and thorough. Soon the sense of bewilderment will disappear, and the case can be overhauled in a radical way, as much as possible being done by the method of Zadig, combined with that of Socrates. It will at times be advantageous to give two days to one case; on the whole it is better not.

In the senior division, while the usual method of case-taking and discussion should remain pre-eminent, the latter can easily be guided to suit the wider knowledge of the student; there may be less display of dogmatism; obscure cases may be brought up and the obscurities allowed to wait for further light; perambulations of the wards (the old "walking the hospital") may take place; at times the students in groups of two and three may be set to make what they can of a case and then cross-examined on it after the fashion of the final oral; expeditions may be arranged to such repositories of chronic and rare diseases as the Parochial Hospital or the Home for Incurables; uncommon cases, whose address is known to the lecturer, may be got together for demonstration.

Equally important with the division into junior and senior sections is the question of numbers in the ward clinic. In my opinion the bedside class should be limited to, say, 25, and if it

is only half of this the compensation is great. I need not dwell on the advantages to student, lecturer, and patient of a small clinic. But in our big schools the students will go on flocking to a popular man, just as in days of old, when I can remember 90 of us in one ward struggling for knowledge. What a godsend it was to have a chance of listening to some common sign—amphoric breathing, or a pleural friction, or a presystolic! The wonder was that the patients submitted so graciously. But Grainger Stewart was a master of clinical teaching, and managed his huge following in a wonderful way.

Tutorial classes are indispensable of course; without them it would be quite impossible to convey a thorough systematic knowledge of clinical methods. Much more time has to be given to this department now. A complete course ought to be mapped out, spread over the two winters and intervening summer, the old paramount methods, according to Guttmann, coming first in order.

Preparation, fresh study, is of essential importance for every good lecturer, and if the students can be told beforehand what the subject of the next clinic is to be, so that they may come with some book-knowledge, the good they get will be vastly multiplied.

Most clinics should not be completed in presence of the patient. After the history and examination, freedom of speech and courteous consideration for the feelings of the patient alike demand his withdrawal. Hence a special side-room or small theatre should be provided for the bedside clinics.

Clinical lectures have their own important place to fill. They should be demonstrations rather than lectures, and I look back with pleasure and gratitude to those I listened to as a student, though one or two lecturers who were admirable bedside teachers made the mistake of using the case as a text for an old sermon, a read one too!

The time to be given to the clinic should not be rigidly limited. Two hours should be allotted in the daily college time-table; this will generally allow a fairly complete discussion, and will also permit the students to verify the signs at the end, where the lecturer gives his sanction. More money might be very well spent in paying the tutors, and in making handsome provision for the practical classes, especially for the use of advanced students. They should all be taught what is at present acquired by the few who are lucky enough to become house-physicians in teaching hospitals.

THE TEACHING OF MIDWIFERY

NO subject in connection with medical education is at the present time more keenly discussed, and none stands more in need of consideration, than the training of our students in practical midwifery. That there are serious defects in the present system, and good grounds for the uneasiness which is manifest in the General Medical Council and among the leaders of obstetric opinion, is abundantly apparent. The Council have on several recent occasions dealt with this subject and at the present time have under consideration the whole question of the practical training of students in midwifery, while individual teachers have again and again called attention to the inadequacy of the clinical teaching and have expressed in the strongest terms their sense of the serious consequences to the public that may arise therefrom. In an important paper, read a few years ago, Cullingworth showed that the introduction of antiseptics, which has practically abolished septicæmia in lying-in Hospitals, had so far had little if any effect in reducing the puerperal mortality in private practice. An even more serious indictment was brought against the present practice of midwifery in England by Japp Sinclair in his opening address as President of the obstetrical section at the Montreal Meeting of the British Medical Association. He stated his conviction that, as the result of an unwarrantable resort to operative procedures, very serious evils and an unnecessary amount of misery were occasioned. The great advances which have been made in the science and practice of obstetrics have, in his opinion, effected little diminution either in the mortality of childbed or in the injuries attributable to parturition. How is this seeming anomaly to be accounted for? There may be other explanations, but the late Milne Murray, referring to Japp Sinclair's strictures, in a paper on the use and abuse of the midwifery forceps, indicated perhaps the most important, certainly the one which bears most immediately on the question under consideration. The strictures, he maintained, did not reflect only on the general practitioner. "If the position of midwifery were aberrant, no small part of the blame must lie at the door of the teachers of obstetrics. If the practice were loose, the teaching must be greatly at fault."

The *prima facie* case is even stronger than the *a posteriori* evidence. A comparison with the clinical instruction required in the two other branches of practical medicine shows that there is truth as well as epigrammatic exaggeration in the assertion of Japp Sinclair that our students "learn surgery which they will never practice, and they will practice midwifery which they have

never learned." In some quarters there is a disposition to regard midwifery as a small and relatively unimportant subject, which cannot at any rate be reasonably compared with surgery in importance. We should be the last to minimise the value to the practitioner of a thorough training in surgery, but it must be admitted that midwifery and the subjects taught with it form a larger part of the future work of the majority of our students, a part too in which the consequences of inadequate training are liable to prove disastrous. That being so, it is not easy at first sight to explain why, in the remarkable development of clinical instruction, clinical midwifery should be comparatively neglected, and should continue to be "the most prominent defect in medical education in this country."

There are, however, difficulties in the way of placing midwifery on the same clinical basis as medicine and surgery. The lack of sufficient hospital material has thrown the practical instruction of students largely on the outpatient departments, where the difficulty of securing efficient instruction is very real, as all who have considered the subject well know. The difficulty lies not so much in the insufficiency of material as in the inability to utilise it. The protracted nature of the attendance on cases of labour, together with the uncertainty as to time, makes it quite impossible for the existing staffs to adequately supervise even the number of cases which the student is at present required to attend, and this number is likely soon to be increased.

The reference in the present inquiry is "the ideal method of teaching midwifery." Leaving practical difficulties out of account, it were easy enough to propound an ideal system of instruction, but we take it that the purpose in view is rather to sketch a system which is capable of immediate attainment, or which there is some hope of reaching in the near future.

Before considering what can be done to improve the standard of midwifery teaching, it is necessary first to inquire what the present system is, and to see how far and in what respects it falls short of the ideal. What evidence of instruction and proficiency is meantime required of our university student before he presents himself for graduation? The existing regulations require that he must have attended a systematic course of not less than one hundred lectures, and that he produce evidence that he has attended twelve cases of labour, three of which have been conducted under the supervision of a registered practitioner, or that he has attended for three months the indoor practice of a lying-in hospital. In regard to practical instruction, it will be seen that the requirements come far short of satisfying the ideal.

The systematic instruction in midwifery given in our Scotch universities has always been of a very high order, and it may safely be assumed that its reputation and character will be maintained. There is a danger, however, that gynæcology—which at present is included in the course—may be allowed to encroach too much on the time of the lecturer, who finds it increasingly difficult to deal in any adequate way with the great developments which in recent years has taken place in this branch of the subject. No doubt it is the opinion of some—other than obstetricians—that the time assigned for the systematic teaching of midwifery is too long, and that if a hundred lectures only are to be given to medicine and surgery, fifty should be sufficient for the smaller and more limited subject; but, as the late Milne Murray pointed out, obstetrics is in quite a different category in respect to systematic teaching, in that the various conditions to be considered must be dealt with in detail rather than on general principles. Whether the time allotted to the systematic teaching of medicine and surgery is sufficient does not concern us here, but we agree with Milne Murray that one hundred lectures are not too many for the systematic consideration of midwifery, and are certainly too few if a full exposition of all the recent advances in surgical gynæcology are to be included. For his suggestion that the systematic lectures should be confined to midwifery and minor gynæcology there is much to be said. Consideration of the more surgical aspects of gynæcology—a knowledge of which is less essential to the practitioner—might with advantage be transferred to a special course. In the interests of midwifery, some such partial separation of the two subjects is advisable, and there are signs that a change in this direction is in contemplation in our universities. There is one other respect in which the course might well be improved. Greater attention should be given to demonstrations on the phantom and to exercising the student in the various operations and manipulative procedures of midwifery practice.

In systematic teaching much depends on the individual teacher, but so far as the general scheme is concerned, there is little that calls for alteration or improvement. Unfortunately the same cannot be said of the clinical instruction. The student, we saw, had the choice of two alternatives. Whichever he adopts, his knowledge of practical midwifery can scarcely be regarded as adequate. The student has a well-known tendency to take the line of least resistance. The majority thus elect to attend twelve cases in preference to attaching themselves to the practice of a maternity hospital for three months.

When he has satisfied the regulations, what knowledge of practical midwifery has the student acquired? He has no doubt acquired some degree of experience in the actual management of labour, but of operative procedures, of the management of the pregnant woman, of the importance and methods of determining the relative size of child and pelvis towards the end of pregnancy, of the management of the normal puerperium, or of the diagnosis and treatment of its more important complications, he has learnt next to nothing. To borrow from the admirable address given by Milne Murray, on relinquishing the post of president of the Edinburgh Obstetrical Society in 1901 :—"If he is of an observant turn, he may have attained some knowledge of the phenomena of labour; but as to how to regulate the process, or how to determine when the process requires regulation, he has learned nothing. In fact, at the end of his practical training (save the mark!) his proficiency as an obstetrician is comparable to that of a physician who has listened to a lecture on heart disease, but has never listened to the heart. They are both equally incompetent, but the former is ten times more dangerous." On the other hand, should the student prefer the second alternative, he will certainly have obtained valuable information in regard to the management of the puerperium and its derangements, and of the management of the more important complications of pregnancy, but his experience of the actual management of labour, his clinical knowledge, in fact, of the most important part of the subject, will in most cases be less. Even under the most favourable alternative, then, the student's knowledge of clinical midwifery cannot be otherwise than very deficient.

How may this deficiency best be remedied? What is the ideal method of teaching midwifery? That is the problem which has been set down for our consideration. The ideal method is that midwifery should be taught in the same way and with the same thoroughness as medicine and surgery. There are many difficulties to be overcome, but they are not insuperable, as the experience of the continental Frauenklinik shows. Certainly they should not be permitted to arrest all advances in the direction of improving the present position. But the advances must be gradual. To issue regulations with the view of immediately securing a system of instruction similar to that which obtains in German universities would be unwise. Clinical medicine and surgery have reached their present position by a process of gradual evolution. So it must be with midwifery. The chief difficulty will be found in our hospitals, which have meantime inadequate facilities for clinical instruc-

tion. Reorganisation of these will be required, but it must be gradual. An attempt should first be made to utilise more fully the outdoor practice, which in most of our hospitals affords the chief field for clinical instruction in the actual management of labour. A few years ago Herman, in an article in *The Practitioner* on "The Present Mode of Teaching Midwifery in London," suggested a method of accomplishing this, and securing adequate supervision and instruction, without entailing any considerable increase in the hospital staff. He started from the thesis that "Good midwifery teaching is that which teaches the student how to *prevent* complications in labour, and disease afterwards." To prevent complications he insists that the most important thing is early diagnosis. To effect this the patient must be seen early in labour. He advises that the practitioner should go at once with the student to all cases. After having directed him in all the necessary antiseptic measures, he should next determine, or instruct the student how to ascertain, the factors on which the character of the labour will depend; the relative size of child and pelvis, the position of the child, the general condition of the woman, and the strength of the pains. Should any abnormality be detected it should be dealt with, or, if the time for interference has not come, he should direct the student how to find out when it has come. On the other hand, should everything be found natural, the student, or students, may be left in sole charge of the case. This plan has two great advantages: it does not require of the physician the irksome waste of time involved in watching a natural labour; it affords clinical instruction to the student in the most important and difficult part of midwifery practice—diagnosis early in labour. The physician who undertakes this work will have his time fully occupied. "He should give his whole time to this work, and should receive sufficient direct remuneration to make the post attract a capable man."

What the regulations, soon to be issued by the General Medical Council, may be, we do not know; but it may be assumed that they will remove the most prominent defect in the present system by making attendance on the practice of a Maternity Hospital compulsory. But whether or no, it will still be in the power of our University authorities to initiate this necessary change—and after all, efficiency, or the reverse, in the clinical teaching of midwifery must rest, not on regulations, but with the Universities themselves.

The following recommendations, if adopted, would remove at least the chief defects which have been noted in the present training of our students in practical midwifery. They are not suggested with the object of establishing the ideal, or even

final method, but as a step in that direction. They take us probably as far as in existing circumstances we can go.

1. That every student should be required to attend for three months the indoor practice of a Lying-in Hospital.

2. That every student must produce evidence that he has attended at least twelve cases of labour, the first six of which have been under the direct supervision of a member of the staff of a Maternity Hospital. To secure adequate supervision, a physician should be appointed whose sole duty will be to give clinical instruction to students in their attendance on out-door cases. His whole time should be given to this work.

3. Certificates of attendance on cases should only be accepted from a member of the staff of a Lying-in Hospital.

4. Before the student is allowed to attend his cases he should be required to produce evidence (*a*) that he has attended a course of lectures on midwifery (this need not be the full systematic course; a short preparatory course would be sufficient); (*b*) that he has attended for at least one month the indoor practice of a Maternity Hospital.

THE TEACHING OF MEDICAL JURISPRUDENCE

THE writer is of opinion that the number of so-called systematic lectures should be reduced to a minimum. Such a course of lectures is a relic of bygone times when books were few and expensive, and oral instruction was the only means of imparting the teacher's knowledge. At the present time excellent text-books in every branch are only too numerous, and the difficulty lies in the selection.

The student can educate himself far more satisfactorily from a text-book than he can possibly do by listening to the formal lecture. In many cases the reputation of being a good teacher lies in the fact that he is a good dictator. The students employ their time merely in writing to dictation, and at the end possess but an incomplete and unsatisfactory book of notes. This surely is a waste of valuable opportunity.

A certain text-book having been recommended (and preferably one not too encyclopædic), the lecturer should point out, day by day, those subjects, or parts of those subjects, which should be read and mastered by the student.

In this way the teacher is left to a great extent free to devote the class meetings to explanation, practical work, or demonstrations. Such instruction leaves a far more lasting impression

than any mere lecture, no matter how brilliantly delivered it may be.

As regards Medical Jurisprudence, only a few systematic lectures are required, and those should deal mainly with the legal aspects of Medicine and those branches of Criminal Law with which a medical man should be conversant.

Practical instruction should be the aim of the teacher, as, for example, the best methods of resuscitation. The student should be taught the use of the spectroscope in the detection of blood-stains or poisons. Instead of taking up time in describing the symptoms of poisoning—which are fully described in every text-book—the more usual and easily employed methods of detecting toxic substances should be shown.

Dissections of the bodies of infants should be made before the class to illustrate the methods of determining whether death has been due to natural causes or criminal means.

Students should be familiarised with the method of performing medico-legal autopsies, and it is essential in this relation that they should have previously studied general pathology and its application in the post-mortem room.

In order to provide the material for instruction it is very desirable that the lecturer should hold the position of Police-Surgeon, and so be enabled to devote his whole time and attention to medico-legal work. If he does not hold this position, then he should be so associated with the Surgeon of Police that his class may be afforded ample opportunity of being present during medico-legal autopsies. The lecturer who has not such facilities at his disposal is greatly handicapped in his teaching.

The lecturer should also keep himself informed as to when criminal trials are held, so that his students may be present and so learn the procedure in the Justiciary Courts.

Lastly, one or two lectures should be given on the important subject of Medical Ethics, not because it is specially related to Legal Medicine, but, as it is not treated of by any other lecturer, it might quite appropriately find a place in the comprehensive course of Medical Jurisprudence.

THE TEACHING OF MEDICAL JURISPRUDENCE

IN our Scottish Universities a course of fifty lectures is devoted to this subject, which may be defined as the application of all branches of medical knowledge to the purposes of the law. The instruction given (in the past at least) has tended to be too theoretical, and too crowded with scientific facts of a somewhat

disconnected nature, while it has concerned itself too much with the consideration of criminal cases. The function of such a class should be to inform the student as to the course to be pursued under very varying circumstances, some of which are bound to occur to every medical practitioner. The ordinary medical man will probably never be called on to make a chemical analysis for strychnine, and may never even be asked to identify a blood-stain, but he may be asked at any time to perform a post-mortem examination at the request of the coroner or procurator-fiscal, to give a precognition, to write reports on criminal and civil cases, to examine and report on injured or assaulted persons, to certify deaths, conduct life-insurance examinations, and a dozen other matters requiring some medico-legal knowledge.

Lectures on forensic medicine should be lightened of many of the purely scientific facts with which they are apt to be burdened. These can always be obtained from a good modern text-book, or can be printed on sheets containing synopses of the lectures, and distributed daily to the students. There the latter can find tables of weights and heights of the body at different periods, and development of the fœtus; dates of ossification of bones, and so forth. The instruction given should then be of as practical a character as possible, full attention being given to the conduct and attitude of the medical man in civil as well as criminal cases, and illustrated by instances occurring within the experience and knowledge of the teacher himself. This kind of information is invaluable to the young general practitioner. He should be told clearly what he should do when called by the police to a person found dead, how to prepare and give his evidence, what precautions are to be adopted in examining persons, how he ought to arrange about fees in civil cases, what his duty is towards his private patients, towards servants and their employers, and so on. He should be taught a simple yet adequate knowledge of the common law of his country, and in general prepared for those many pitfalls which are bound to await the general practitioner, though he may never see a man with a cut throat or a woman poisoned by sulphuric acid.

The course must be made interesting by practical demonstrations. Arrangements might be made with the pathologists attached to the school, whereby the members of the class might be shown the special points to be attended to in doing a medico-legal autopsy. There is usually little difficulty in obtaining the bodies of infants (still-born or not) from the local maternity hospital, and these can be employed advantageously in the class-room to demonstrate the very important points connected with cases of infanticide. When the High Court of Justiciary holds its sittings, the class should attend so that the members

may learn at first hand the procedure of the criminal court, and see how evidence may be given clearly and convincingly. Practical instruction in the examination of the insane, a matter of much medico-legal importance, will be got by the student during his course on mental diseases, and the teacher of the latter subject might be asked to give one special lecture on insanity as a plea in criminal cases, with patients shown, to illustrate the various points.

Lastly, the lectures and demonstrations should be supplemented, if possible, by a short practical course. In this each student would be instructed in such points as the chemical, physical, and spectroscopic examination of blood-stains from various animals; in the microscopic appearances of hair, wool, cotton, starch grains, and other objects important in identification; in the application of the Bertillon system of identification, and in the taking and comparing of finger-prints; and lastly, in the methods of analysis of types of the more important poisons. The object of a short practical course like this is not to make the student an expert medical jurist, which is manifestly impossible, but is to show him how such investigations are carried out, to illumine and amplify his reading and lectures, and to enable him better to estimate the value of evidence based on such technical details.

Medical Jurisprudence taught in this way would be very much more interesting to the student, and prove immeasurably more useful to him in after-life.

THE TEACHING OF PATHOLOGY

SPECIAL excellence in the Teaching of Pathology has always been a feature in medical education in Scotland, but there is always room for improvement, and to many it would appear that the time has come for some alterations in the Pathological course. Though firmly convinced that the student's Pathological training should extend into the period of his final clinical study, one would certainly have no desire to see it started later than has been the rule in the past. In many ways, indeed, one might wish to see an even earlier start than at present. Some preliminary instruction in General Pathology, for instance, could not fail to give the student a more intelligent interest in his systematic course of surgery. At the same time, however, there are obvious disadvantages in beginning the Pathological work proper before the student has had an opportunity of completing

his Second Professional Examination. Every teacher is fully aware of the unsatisfactory system which allows a student to attend a course on a new subject while he is still fully occupied with the study of a previous subject. During the past year I have taken particular note of the results in the class examinations of students who have started their systematic course in Pathology before passing the Second Professional Examination. Some of these students have obtained over 75 per cent. in the first-class examination; while the results in the second, and more particularly in the last examination, almost justify the refusal of an attendance certificate. The conclusion is inevitable that a very considerable part of the course has been practically lost to them, and that the way is paved to a subsequent "cram" of that part of the work. I am sure there is no more urgent necessary reform of the curriculum than some check of this most pernicious system. For this reason, then, one cannot recommend the commencement of the Pathological course before the student has had the opportunity of passing in at least anatomy and physiology. As far as I can gather from what I have heard of the proposed new curriculum, this opportunity will be afforded at the middle of the third winter session, three months earlier than under the present arrangement.

The proposed institution of three terms in the academic year appears to me to lend itself naturally to a division of the Pathological course into a Junior and Senior section. The Junior course of systematic instruction could be started in the January of the third winter session, and would consist of a three months' course of General Pathology, much as is given in the first fifty lectures of the course as at present. Concurrently with this, however, I should like to see a practical course run on somewhat different lines to the practical class, as at present. The practical meetings should be used to illustrate the lectures. They should be of two hours' duration, and in addition to the demonstration of general pathological processes on microscopical specimens given out mounted, provision should be made for the practical instruction in pathological technique. It would not be necessary at this stage to provide for the student the complete set of slides that are given in most practical courses, as at present. Comparatively few judiciously selected specimens illustrating degenerative changes, vascular and inflammatory phenomena, tumours, etc., would suffice. Some elementary practical bacteriological work should also be done. Such practical work would have undoubted special value if done concurrently with the lectures; but as it would probably be impossible for all the students to do the practical work in the winter term, a similar practical course might be given in the

following summer session. At this stage it will be seen that attendance at post-mortem examinations would not be advisable. There can be no doubt that this preliminary course would be of immense value as an introduction to the systematic lectures on medicine and medical clinical work.

The second part of the course would be started at the beginning of the fourth winter session, and would consist, as in the Junior section, of lectures and practical work running concurrently. In the lectures the special pathology of the various organs would be described, and in the practical class special attention would now be directed to the histology and morbid anatomy of the special diseases. It is at this stage that compulsory attendance at post-mortems should be demanded. I should not desire that the students should mount and stain the illustrative slides themselves, but practical work should be an essential part of the course. The work, however, should be more in the direction of clinical Pathology. The student should be practically taught, for instance, to stain blood films, to examine special pathological products, and, in brief, to become practically familiar with the modern aids to clinical diagnosis. Clinical bacteriology would, of course, form an important branch of the subject, and the common pathogenic bacteria should be practically studied. With such practical work an essential part of the course, I see no necessity at present for compulsory attendance of the ordinary student on a special course of bacteriology, though, as a matter of fact, at present a very considerable proportion of the students do attend such a course. As regards the proper time for the Pathological examination, students might be prepared for it as at present, after one year's study, though doubtless many would prefer to take other three months, and appear at the end instead of the middle of the winter session. So much in general outline for the course as one would like to see it: there are certain other points one would like to refer to. It must be insisted on that Pathological work should not cease with the completion of the Third Professional Examination. That students so regard it must, I am afraid, be partly ascribed to an apparent unwillingness on the part of the physician or surgeon to follow their cases to the post-mortem room. If attendance at the post-mortems of all cases dying in the wards was made compulsory for the students of the clinique, the gain would be incalculable; only at the sectio can the case as a whole be appreciated, and though the appearances of individual organs in the various diseases may be taught in demonstrations, nothing can impress the student so much as attendance at the post-mortem itself. In recent years, in connection with lectures on Special Pathology, I have on occasion departed from the stereo-

typed lecture, with results so encouraging that one only wishes more time were available for an extension of the idea. In the place of an ordinary systematic lecture I have given a demonstration on all the organs from some special case, and endeavoured to trace the cause of the condition and discuss the relationship of the various changes in the organs to one another. Nothing, however, can take the place of the post-mortem room instruction.

The subject of morbid anatomy is the branch of Pathology in which improvement of teaching is most urgently required. Difficult as it is to teach histology to a large class, it is even worse to attempt to demonstrate naked-eye appearances to more than a strictly limited number of students. In some way or other instruction in the post-mortem departments of the various hospitals (in addition to that given at the sectio) should be made available to supplement the teaching in the practical classes. I have not found museum specimens of so much value in teaching junior students. Fresh specimens or others prepared by modern methods which can be actually handled by the student are much more useful. Weakness in morbid anatomy from a surgical point of view has been, in my experience, even more marked than in medicine. I should like to see more systematic instruction, in the shape of demonstrations in Surgical Pathology, for senior students. There is plenty of room in the University for a Lectureship on Surgical Pathology, on the lines of the present course of Surgical Anatomy; but here again the difficulty of teaching large classes without a staff of competent demonstrators must be remembered.

Some teachers, when asked how they think their own subject should be taught, are apt to think that all would be well if they had only double the time available. While not quite so greedy, and while remembering the danger of exaggerating the importance of the subject one is specially interested in, I plead guilty to a desire for a little extra time for the study of more particularly Morbid Anatomy and Clinical Pathology, and with the course rearranged as I have suggested, I believe that the time could be readily found, and that by its use in the study of Pathology the student would be better qualified for his final studies and for the future practice of his profession.

THE TEACHING OF THE SPECIALTIES

THE editor has permitted me, instead of confining myself to my own branch, to deal generally with the teaching of the various special subjects.

The development of specialism in medicine is only a part of

the general onward march of humanity. In every line we see the same tendency; in law, in commerce, in science, even in the War Office, the tendency of the day is towards specialisation. The beneficial effects are seen everywhere. Some disadvantages there are, there is no doubt, but these are far outstripped in the general advance. We may take as only one instance, the enormous strides in abdominal and cerebral surgery which are in great measure at least due to specialists.

But the question which I understand the editor wishes me to deal with in the teaching of the special subjects to students. Of these some are already compulsory, and others are alternative, and it is a little difficult to see why some are placed in the one and others in the other category. Why, for instance, is insanity compulsory and diseases of children optional.

But criticism is not my duty, but suggestion. It is obviously impossible to turn out our graduates with an expert's knowledge of every subject, and that, one may be permitted to remark, seems the common error into which the authorities have fallen.

Gynæcology, ophthalmology, dermatology, laryngology, and other special subjects are each taught by one or more experts whose tendency at least sometimes is to endeavour to impart to their students too much of their own learning, forgetting that the student's brain has only a limited power of absorption, and that it is already overtaxed with the greater matters of medicine and surgery. These subjects have grown so great that there is little temptation for teachers to endeavour to deal at all with the special branches, as, for instance, the professor of surgery used to skim over the diseases of the eye and ear, the professor of medicine over those of the skin, and the professor of midwifery over those of children.

It is probably hardly necessary to note the fact that certain of the special subjects are only alternatively compulsory. The student of to-day has a very shrewd notion of the value of a class, and heeds little whether he needs a certificate or not.

From the teacher who looks beyond his own special subject to the larger question of the fully-trained practitioner, the real question is how much should the ordinary student be taught. In the writer's opinion it is the common diseases on which the teacher should spend his time. A few systematic lectures to form a scaffolding for the more important clinical teaching are necessary, but it is to the latter that most attention should be directed. It is in the small classes where the student comes into intimate relations with his teacher that he learns most, and these should, nay, must be increased. A class of fifty may benefit much from a clinical lecture but the same class split into sections of ten will learn at least three times as much. In

these small classes the students' difficulties are more apparent, and are more easily smoothed away: he can ask questions, and he can be asked questions, and make useful mistakes which he will probably never forget. Having got some sort of foundation he can thereafter attend the ward visits and the out-patients with much greater benefit; indeed these departments might with advantage be limited to those who had already been instructed in the subject.

There remains the question of the teaching of those who wish to acquire more than an average knowledge of the special subjects. Here we might take an example from the Arts Faculty and introduce "honours" courses. These would in medicine be attended usually by graduates, but they should be more than the ordinary post-graduate cram, and rather aim at the higher knowledge required by the specialist.

THE TEACHING OF OPHTHALMOLOGY

THE importance of a good working knowledge of ophthalmology to the general practitioner cannot be over-estimated, especially when we consider the high percentage of refractive errors and defective eyesight met with among school children, and the injurious effects to the general health when these defects are left uncorrected. Not only so, but after school life the troubles and discomforts arising from refractive errors seriously handicap the sufferer in the struggle for existence. Headaches, for example, are a frequent accompaniment, and the real cause may readily be overlooked by the medical practitioner who is not familiar with this form of ocular complication.

The reason why so few of our medical men examine systematically for refractive errors and make use of the ophthalmoscope is because of the defective training they received in clinical ophthalmology during their medical curriculum. It is true that a compulsory attendance on a course of ophthalmology has been in force in this country for the past ten years or so, but such a course is, in our experience, more or less valueless, and will remain so till the subject forms part of the final professional examination. The majority of medical students pay little attention to the work, being quite satisfied so long as their attendance cards are signed up; for here endeth the lesson. This state of matters has been commented on adversely by the inspectors of the General Medical Council at their last visitation.

If the recommendations of the General Medical Council with

regard to ophthalmology in *the final* were loyally carried into effect our graduates would, as in every other country, possess a working knowledge not only of external diseases of the eye, but also of ophthalmoscopic affections and of the methods for the estimation and correction of the simpler errors of refraction and accommodation. We have always maintained that the correction of these refractive errors should be done by the medical attendant and not, as at present, by ignorant spectacle vendors and so-called qualified opticians. It is not creditable to us as a profession when we think that through our defective medical training the optical correction of one of the most delicate and complex organs in the body should be entrusted to the care of those who are ignorant of the principles underlying the practice of medicine and surgery. The eye is not the simple optical machine described in certain quarters and trade journals. It is part of a whole, and very susceptible to general derangements, regarding the nature of which the medical man alone can have any idea.

From a considerable experience in the teaching of ophthalmology we are firmly convinced that it is futile for any one, not conversant with the first four years of the medical curriculum, to begin the study of the optical defects of the eye. It is essential to have the necessary medical training beforehand to enable one to recognise diseased conditions, and so distinguish such from optical defects. Yet the Worshipful Society of Spectacle Makers finds no difficulty in the matter, for it grants diplomas to tradesmen and others who frequently do not possess even the technical knowledge of the craft. The action of this society in granting bogus qualifications might be regarded as a sort of glorified farce, but for the fact that the public is being misled by what looks like a colourable imitation of a medical diploma.

But, as already stated, only a few of the medical men in this country undertake the work of prescribing spectacles for their patients, the ophthalmic specialist being practically the only qualified person to whom the public can apply with safety. The services of the ophthalmic specialist are at the disposal of the rich and the poor, the former by paying a specialist's fee, and the latter by accepting charity at the public clinic. But the middle classes cannot, as a rule, afford the specialist's fee, and are not allowed to accept charity. There is only one door open for them, the optician's shop or the dealer's store. The middle classes are quite able and willing to pay the ordinary medical fee, but where are the medical men to undertake the work?

The only solution of the difficulty is for the medical practitioner to be taught to do simple refraction work. It is much

easier to teach advanced students or post-graduates how to correct the simpler refractive errors than to teach them how to treat dyspepsia rationally. In the former the work, if done under cycloplegia, as it always should be in the case of young people, is to a large extent objective, whereas in the latter one is face to face with an obscure chemical problem, in the treatment of which empiricism is allowed to run riot as a rule.

We understand that one of our Scotch universities has for the past four years or so examined all its candidates on opthalmology in the *final*. A question is set in the surgery paper, and this question must be answered. In the clinical examination each candidate gets three cases and an external disease, an ophthalmoscopic affection and an error of refraction. The examination is conducted by the lecturer on ophthalmology along with the Professor of Surgery. From the General Medical Council's reports we find that this examination has been reported as "excellent," and we venture to suggest that other universities and licensing bodies would do well to follow this example. If this were done, ophthalmology would then receive the proper attention in the curriculum and in the final examination it deserves, with the result that in time the prescribing of glasses would be undertaken by those medically qualified, and not, as at present, by men who are obviously unfitted for the work.

LARYNGOLOGY, &c.

OTOLOGY, rhinology, and laryngology are probably about the most difficult subjects to teach successfully to a large class. It must be remembered that the structures in these regions are deeply situated, requiring special appliances to bring them into view, and that they can be seen by only one observer at a time. The difficulties of teaching in Edinburgh are increased owing to the tendency of students to attend such classes in the summer, thus causing excessive crowding for a short period, while during a great part of the year the department is nearly empty. Another thing which interferes with successful teaching is the fact that many students take these subjects far too early in their course of study. Like the average mother who looks upon measles as inevitable for her child, and thinks it well to get it over as soon as possible, the student too frequently is anxious to get his "ear and throat work over as soon as he can." Owing to the arrangement of the curriculum he perhaps finds that he has a spare hour in his third year, and proceeds to devote it to ears and throats. It needs no argument to show

that this is little better than a waste of time on his part, and that it hampers the teacher and those students who are ready to benefit by the teaching. If the University cannot or will not enforce some regulation to prevent this, it is to be hoped that the Carnegie Trust will discourage the too early attendance on such classes.

In Edinburgh these subjects are taught partly by systematic and partly by clinical lectures combined with out-patient clinics, and this seems to be the ideal method of conveying instruction. Still there is much room for improvement, owing to the numbers attending, so as to give each student the individual supervision which he ought to have. Clinics ranging from twenty to fifty in number ought to cease except at such lectures as do not require the individual examination of patients. I would suggest that for all practical work the class should be divided into two. In the first division should be taught the practical methods of examination and the normal appearances. Until a student has shown his proficiency under varying conditions in using the laryngoscope, etc., he should not be allowed to pass into the second division in which the abnormal conditions would be taught. Each of these divisions should be subdivided into sections not exceeding ten in number (but preferably of six) under a teacher. While the surgeon should supervise and direct the whole work it would clearly be impossible for him to undertake all these sections himself. He could take the more advanced sections and avail himself of efficient assistance obtained from the assistant surgeons, the clinical assistants, and possibly of some more advanced clinical clerks. All this subdivision of the work would entail careful organising, but it would turn out the student better trained than at present, and make room for more post-graduate men attending the department for short periods than is possible at present.

Unfortunately the splendid department recently opened has been badly arranged, and it is difficult, if not impossible, to organise the work in sections in one large noisy out-patient room. What is needed is several smaller rooms, properly fitted up, and communicating easily with each other. The surgeon is too much occupied by small details, and it would greatly assist him in teaching were the trivial cases sifted out, and the more serious cases grouped both for teaching and treatment. Such a department should be a great consulting department, and the large number of trivial cases that attend should be discouraged in the interest of those really requiring consultations, and because in many cases they could equally well be attended to outside. Attention to these circumstances would also have the effect of making the teaching more practical and more efficient.

Meetings of Societies

Glasgow Medico-Chirurgical Society

THE first meeting of this Society for the session 1906-1907 was held on October 5—the President, Dr Lindsay Steven, occupying the chair. There was a large attendance.

1. Dr Lindsay Steven and Dr Charles Workman described the clinical and pathological aspects of a case of malignant disease of the œsophagus, complicated by gangrenous excavations of the lungs. The patient, a man of 49, had been admitted to Dr Steven's ward at the Royal Infirmary on September 12, suffering from total inability to swallow. This had lasted for about a week before admission. The earliest symptoms had been observed a year before. The bougie showed an obstruction in the gullet about 11 inches from the incisor teeth, and the end of the bougie brought back caseous purulent matter. The heart was healthy, but there was a cough with offensive expectoration, and a dull area rapidly formed in the base of the left lung posteriorly. The abdomen was normal; no gastric tumour could be felt and the urine presented no abnormality. Slight fever was present from time to time. In spite of careful rectal feeding, the weakness and emaciation already marked greatly increased, and the patient died on September 18, his chief complaint being that of thirst.

Dr Workman performed the autopsy on September 19, and found a large fungating ulcer in the œsophagus 2 inches deep, and situated just opposite the tracheal bifurcation. Two openings led directly from it into the left main bronchus. The lower part of the left lung was occupied by a large gangrenous abscess which had almost ruptured through the pleura. The right lung presented bronchitis and emphysema. The spleen and liver were healthy. The growth was a squamous-celled epithelioma. Macroscopic and microscopic specimens were shown.

2. Dr Lindsay Steven showed a typical heart with mitral stenosis due to chronic rheumatic endocarditis. The condition had lasted many years, yet the patient (a woman) had been in reasonable health and had borne nine of a family. In the latter part of her life there had been great dropsy, due partly to interstitial nephritis. Great good had been obtained by the use of Southey's tubes.

3. Dr George T. Beatson, C.B., read a paper on "Chauffeur's fracture" (fracture of the lower end of the radius in starting

automobiles), illustrated by a number of lantern slides. The condition had been described by Lucas-Championière in 1904, and in the *Boston Medical and Surgical Journal* (November 3, 1905. Mr Lund had contributed a paper with an account of several cases. He (Dr Beatson) had had two. A short account was then given of the working of the ordinary petrol-motor, which was a four-cycle engine. The first stroke of the piston was the *charging* stroke, the second the *compressing* one, the third the *explosive*, when the carburetted vapour was ignited and the fourth the *exhaust* stroke, when the products of combustion were driven out. To start this cycle the chauffeur had to turn a handle attached to the crank shaft at the end farthest from the fly-wheel, and in this operation might receive injury in one of three ways: (1) the hand might be carried round and wrenched; (2) the handle might not be carried far enough round to get over the dead-centre of the engine, and swinging back might wrench the hand; (3) there might be back-fire or too early ignition of the petrol. It was an accident produced when the hand was over-extended and rotation was attempted. The lesion was a transverse fracture of the lower end of the radius above the articular surface, and resembled a Colles without displacement. Pain was felt, but it was often thought to be due to a sprain. The best treatment was the Carr's splint and early movement of the fingers.

Dr Gow, one of the sufferers from this accident, spoke on the subject.

4. Dr S. J. Cameron gave a lantern demonstration on Fibromyomatous tumours of the uterus. A large number of slides were shown illustrating degenerative changes in such growths—a matter to which Dr Cameron has devoted much time and attention.

Glasgow Pathological and Clinical Society

THE first meeting of the session 1906-1907 was held on October 8—the President, Dr Lindsay Steven, in the chair. There was a good attendance.

The new President, who has succeeded Professor Muir in the chair, thanked the Society for the honour done him, and said he hoped to give an address later in the session.

1. Dr T. K. Monro and Dr Adams showed a patient suffering from spasm of the trunk and thighs. The case was that of a middle-aged man, suffering from tonic spasms extending from the epigastrium to the knees. These were occasionally severe,

but free from pain, and ceased during sleep. They had lasted three years. They were aggravated by such a movement as turning. Sensation was normal, the reflexes were the same, and the viscera were healthy. Most relief was got from sedatives, but each drug in turn seemed to lose effect after a time. The man was a bank-clerk, accustomed to stand a great deal, and Dr Monro said he was inclined to regard it as an occupation-neurosis.

Dr Adams said he had tried the effect of a plaster jacket, but with no good result; he had also cauterised over the spine, under chloroform. Of drugs he thought veronal had done best. The President commented on the case, remarking that it reminded one a little of Thomsen's disease, but Dr Monro said that had been considered, only there were some important points of distinction between the two.

2. Mr Freeland Fergus and Dr A. L. M'Millan read a paper on the removal of the lachrymal sac in cases of chronic suppuration. Mr Fergus said he had done so first about seven years ago, and since then had done several cases. The real course of events was that suppuration occurred first through organisms lodging in the reticular folds of the sac, and the obstruction was secondary. The commonest organisms were streptococci and pneumococci. No case should be operated on without giving a trial first to regular probing; if this failed, the sac should be completely ablated. Tubercular cases were the worst, as the bone was often diseased. The tears gave no trouble afterwards, and it was possible that the irritation of the inflamed sac being removed, the flow of tears ceased. As a matter of fact, if any annoyance resulted, the tear-gland itself could be removed. This led to no real drying of the eyeball, as the latter was lubricated by the secretion of the glands of Krause at the back of the upper eyelid.

Dr M'Millan showed six cases he had operated on. He dilated the sac first, if need be, with glycerine, incised the skin over the internal tarsal ligament, and went through the fibres of the orbicularis muscle. Müller's retractor was of much help. The nasal duct was cut close to the bone, the sac dissected out, or if friable, curetted. Healing occurred well as a rule. In closing the wound, care had to be taken to replace the inner canthus accurately. The following cases were shown :—

1. Woman after a mucocele of 25 years' duration.
2. A case of dacryo-cystitis of 12 months' standing.
3. Mucocele of a year's existence.
4. Dacryo-cystitis of 18 months.
5. Mucocele of 12 months' duration.
6. Tubercular disease.

The results had been very good, hardly any scar being left. A general anæsthetic was used. The paper was discussed by Drs Inglis-Pollock, Edington, and Adams, and Mr Fergus replied.

3. Dr Napier described a case of malignant tumour of the lung, involving the anterior and posterior mediastina. The patient was a girl of 23, who had been in the Victoria Infirmary in May 1905. There had been before that an attack of what seemed like pleurisy. When in hospital she had a cough and was thin and weak. There was dulness at the base of the right lung behind, and the respiratory murmur was lessened. The sputum showed no tubercle bacilli, nor did some milky fluid withdrawn from the lung by the needle; this fluid consisted chiefly of lymphocytes. She left hospital somewhat improved.

In July of this year she returned with failing strength and appetite. There was more expectoration and cough, and some blood had been coughed up. There was no pain or dyspnœa. The right lung showed a dull tympanicity from apex to base, the breath sounds were lost at the base, and some resistance was felt here. The liver was enlarged almost to the navel. An accute attack of pericarditis occurred in July from which the patient recovered. In August, venous distension was observed in the neck, the breath sounds went entirely from the right lung, cyanosis and dyspnœa set in, and the patient died in September.

Dr Anderson said the post-mortem showed great pleural thickening and a tumour occupying all the lung. Its nature was a spindle-celled sarcoma, and he regarded it rather as an endothelioma arising from the pleura than as a lympho-sarcoma.

The President and Professor Muir discussed this case.

Births and Deaths registered in Eight of the Principal Towns of Scotland during September 1906

DURING the month of September 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 3659 living children, of whom 1851 were males and 1808 females. These births are 475 less than the number registered during August, and 26 less than the number registered during September of last year. The equivalent annual birth-rate is 24.9 per thousand of the estimated population, which is 2.3 per thousand below that for the previous month, and 0.7 below that for the corresponding month

of 1905. The birth-rate for the month varied from 28.2 in Greenock to 20.8 in Perth. The rate in Leith was 27.0; in Dundee, 26.0; in Glasgow, 25.9; in Aberdeen, 25.8; in Paisley, 21.8; and in Edinburgh, 21.5.

Of the 3659 births, 272, or 7.4 per cent., were illegitimate. The rate of illegitimacy was highest in Aberdeen, 10.2, and lowest in Perth, where no illegitimate births were registered. In Greenock the rate was 9.8; in Dundee, 9.4; in Edinburgh, 7.5; in Paisley, 7.1; in Glasgow and in Leith, 6.6.

The deaths of 2271 persons were registered in these towns during the month, of whom 1155 were males and 1116 females. These deaths are equivalent to an annual mortality-rate of 15.5 per thousand of the population, a rate which is 1.6 above that for August, and 1.1 above that for September of last year. The highest death-rate was recorded in Dundee, 17.7; and the lowest in Aberdeen, 12.7. In Greenock the rate was 16.5; in Glasgow, 16.4; in Leith, 15.9; in Paisley, 14.4; in Perth, 13.7; and in Edinburgh, 13.6. In Aberdeen and in Perth the death-rate is lower than that for the previous month, but in each of the other towns it is higher than the corresponding rate for last month.

Of the 2271 deaths, 896, or 39.5 per cent., were of children under five years of age; and 511, or 22.5 per cent., were of persons aged sixty years and upwards. The former are 139 more than the number for August, and 178 more than that for September of last year; the latter are 1 more than that for August, and 36 more than that for September 1905.

Deaths of infants under one year of age numbered 606, being 79 more than the number recorded in August, and 127 more than that in September of last year. These deaths represent an infantile mortality-rate of 150 per thousand births, which is 24 per thousand above that for the previous month, and 33 above that for the corresponding month of last year. The highest rate of infantile mortality occurred in Greenock, 199; and the lowest in Perth, 90. The rate in Leith was 171; in Dundee, 161; in Glasgow, 154; in Edinburgh, 144; in Paisley, 138; and in Aberdeen, 109. In Aberdeen and in Perth the rate was lower than that for the previous month, but in the other six towns the rates were above those for August.

From the principal epidemic diseases 323 deaths were registered, which is equivalent to an annual death-rate of 2.2 per thousand of the population. The actual number of deaths is 102 more than the number recorded in August, and 113 more than that in September of last year; the death-rate is 0.7 per thousand below that for the previous month, and the same amount below that for the corresponding month of last year.

No deaths from small-pox were registered. From measles 11 deaths were recorded, being 13 less than the number in the previous month, and 8 less than that in the corresponding month of 1905. Deaths from scarlet fever numbered 12, and were 8 more than in August, but 1 fewer than in September 1905. Hooping-cough caused 41 deaths, which is 4 below the number for the previous month, but 3 above that for the corresponding month of last year. Deaths from diphtheria numbered 18, and were 4 above the number for the preceding month, but 8 below that for the corresponding month of 1905. Twenty deaths were due to enteric fever, and 14 to cerebro-spinal meningitis, of which 11 occurred in Glasgow, 1 in Dundee, and 2 in Paisley. During the previous month 21 deaths from cerebro-spinal meningitis were registered, all in Glasgow. Deaths from diarrhœal diseases numbered 207, being 106 above the number for August, and 115 above that for September of last year.

Influenza caused 1 death; puerperal septic infection, 3; premature birth debility, 58; alcoholism, 7; diseases of the heart, 202; apoplexy, 128; and malignant disease, 130, of which 70 were ascribed to carcinoma, 8 to sarcoma, and 52 to cancer not otherwise defined.

Pneumonia caused 153 deaths, or 6.7 per cent. of the total deaths; and bronchitis caused 81, or 3.6 per cent. of the total. The former are 16 more than in August, and 14 more than in September of last year; the latter are 2 fewer than in the previous month, and 22 fewer than in the corresponding month of last year

The deaths from tuberculous diseases amounted to 286, which is equivalent to 12.6 per cent. of the total mortality, and is 11 below the number for the month immediately preceding, but 1 above that for the corresponding month of last year. Of the 286 deaths, 159 were assigned to phthisis.

Obituary

James Finlayson, M.D., LL.D., F.F.P.S., Physician to the Western Infirmary, Glasgow

It was with feelings of profound regret that the medical profession of the West of Scotland learned of the death of Dr James Finlayson on October 9, after an illness of sudden onset and startling brevity. Glasgow has lost one of the most

prominent members of the profession, and the very large number of men who gathered on October 12 to pay a final token of respect testified to the affection and honour in which his *confrères* held him.

Dr Finlayson took the degree of M.B. with honours at Glasgow University in 1867, and that of M.D. in 1869. From an early period of his professional life he began to devote himself to medicine, especially in its clinical aspects. He was at the time of his death a physician to the Western Infirmary, and indeed paid his usual ward visit the day before his fatal attack. This position he had held for many years. He was also consulting physician to the Royal Hospital for Sick Children, of which institution he had long been a visiting physician. His wide experience, exact knowledge, and great thoroughness made his services much appreciated in consultations, of which he obtained a large share for a considerable number of years. He had also much success as a clinical teacher.

Dr Finlayson contributed largely to the literature of his profession. Among his best known productions may be mentioned his "Clinical Diagnosis," which attained its third edition in 1891; his article on "Diagnosis" in *Keating's Cyclopædia of Diseases of Children*, 1889; and an "Account of the Life and Works of Maister Peter Lowe, Founder of the Faculty of Physicians and Surgeons, Glasgow." In all, about 150 articles came from his pen. He found fitting scope for his literary gifts in the office of Honorary Librarian to the Faculty in Glasgow, a position which he held till he was elected to the Presidential Chair some five years ago. He was a good type of the cultured physician, and a man of high and conscientious purpose, whose place it will not be easy to fill.

Editorial Notes and News

Appointments. AT a recent meeting of the Managers of the Royal Infirmary, Dr Harry Rainy, Secretary of the Royal College of Physicians, was elected an Ordinary Assistant Physician; Dr R. C. Low, Assistant Physician to the Skin Department; and Dr J. S. Fraser, Assistant Surgeon to the Ear and Throat Department.

New Departures.

DRS GIBSON, Bruce, and Philip have this year combined to give a conjoint course in Medicine instead of the individual courses which they have up to now delivered. It is a new departure which may have far-reaching effects. That it is good for the students, there can, we think, be no doubt, and the students have shown their appreciation of it by attending the combine in almost embarrassing numbers. It seems likely, too, that it will be followed by the separation of the students into seniors and juniors. Nearly everyone now takes two courses of Medicine, and the value of the instruction would be greatly increased if there were recognised elementary and advanced courses.

This separation has indeed been initiated this year in Surgery by Mr Caird, who intimates on his bills that his lectures are specially for senior students.

Chains.

WE long ago expressed in these columns the belief that the first practical step to advance in Medical education in our Scottish Universities was the bursting of the chains which bound the four Scottish Universities in an unholy allegiance to the *status quo*, and we therefore cordially welcome the report presented to the General Council of Edinburgh University which wholeheartedly advocates its dissolution. Further publicity was given to the dissolution proposals in the correspondence columns of *The Times*, where it was evident that the desire for freedom was not confined to one University or to one Faculty. So general, indeed, is the feeling now evidenced, that we feel it necessary to warn the reformers that the whole battle is still to fight, and that no efforts must be relaxed. If the various authorities concerned all desire it, the present Government can hardly do anything to oppose Free Trade in Universities.

The Decline of the Profession.

WE need hardly say that we do not share the views of this year's Royal Medical orator, which remind us forcibly of the familiar statement of the retired colonel that the service is going to the devil. Further, while we personally plead guilty to reverence for the classics, we are not of those who hold that no man is cultivated who is unable to read Horace and Homer in the original. But we had the curiosity to turn up the back numbers of the University Calendars to test the theory of our decadence by the orator's own method, and the following are the interesting figures:—In 1863 there were 82 graduates, one

of them Dyce Duckworth, Anglus. Three of them had degrees in Arts. In 1883, out of 180 graduates, 17 had degrees in Arts or Science; while in 1905, 15 out of 158 graduates had degrees in Arts or Science, some of them in both.

Esperanto.

THERE was a time when Latin was the medium of communication between learned men in all parts of Europe. But that time has passed away, never to return. Our universities still require the student of medicine to show that he has some knowledge of Latin. Prescriptions continue to be written in Latin, of a kind. But the proportion of medical men who could read a scientific paper in Latin with any facility is certainly very small.

The want of some recognised international medium of communication is nowhere more felt than among men of science. The progress of science is dependent upon investigations which are being carried out simultaneously in all civilised countries. It is scarcely possible for an investigator to undertake any specific research without finding it necessary to consult papers written in English, German, and French. Very possibly some really important papers dealing with the subject of study are in Italian, Spanish, or even Russian, though Russian writers, realising that their work runs some risk of being overlooked if published in their own tongue, frequently publish their contributions in German or French.

If it were possible for men of science all over the world to agree upon some language in which all important papers should be published, the advantages gained would be very great. But although it has been suggested that Latin should be revived to fulfil its former rôle, the suggestion has failed to meet with much approbation. Nor does there seem much more prospect of a general agreement to adopt any of the living languages as an international tongue.

Is there any better prospect of a general adoption of Esperanto? We would not take it upon ourselves to prophesy, but it must be admitted that Esperanto has already achieved a success which was never even approached by any of its predecessors, of which Volapuk was the most noted. The first International Congress of Esperantists was held at Boulogne last year, and the demonstration of the utility and practicality of Esperanto as an international language was so convincing that doubters were forced to give the subject some serious consideration, and the movement received a powerful stimulus. During the past year there has been a great increase in the number of Esperanto societies, and several international

associations, including the Union of Shop Assistants and the Society of Christian Endeavour, have had the courage to adopt Esperanto as an official language.

This year's Congress was held at Geneva in the end of August, and the meetings appear to have been even more successful and enthusiastic than those of last year. The hall in which the Congress met, seated for 2000 people, was crowded to its utmost capacity. The meetings were addressed by British, Swiss, French, German, Spanish, and Italian representatives, and it is claimed that all were easily followed, even by those whose studies of the language had only lasted a few months. Special sectional meetings were held of journalists, educationists, Catholics, Socialists, military officers, and others, to discuss the uses of Esperanto in their special spheres. We see no mention of any sectional meeting for medical men.

Whatever the future of Esperanto may be, there can be no doubt that a language which is phonetic, which is practically non-inflexional, which has no irregular verbs, and whose grammar rules have no exceptions, has advantages which are possessed by no other language, living or dead. Whether these advantages more than counterbalance the disadvantages which necessarily attend an artificial tongue is another question. But Esperanto seems to be going ahead, and we may refer those who feel moved to further inquiry to a pamphlet, now in its second edition of 50,000, "How to Speak Esperanto," which contains the rules of grammar, and which may be obtained for one penny from the Esperanto Publishing Company, 14 Devonshire Square, London, E.C.

Glasgow Northern Medical Society.

THE following are the Office-bearers for session 1906-7:—*President*, Dr T. A. C. Macewen; *Vice-Presidents*, Dr Robert Scott, Dr C. S. Marshall; *Treasurer*, Dr James Todd; *Secretary*, Dr Ballantyne; *Reporting Secretary*, Dr R. Scott Frew; *Seal-Keeper*, Dr Edmiston; *Auditors*, Dr T. S. Muir, Dr Malcolm Campbell.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow

THE following candidates, having passed the requisite examinations of the Conjoint Board in October, were admitted Diplomates in Public Health:—Edward M'Killop Nicholl, M.D.,

Edinburgh; David Morley Mathieson, M.B., Ch.B., Edinburgh; Laurence William Pole, M.B., Ch.B., Edinburgh; William Hugh Hill, M.D., Kelso; William Darling, M.B., F.R.C.S.E., Edinburgh; Hugh Angus Stewart, M.B., Ch.B., Pitlochry; Murdoch Macdonald, M.D., Shettleston; Katherine Jane Stark Clark, M.B., Ch.B., Edinburgh; Edward Francis Valenzia, M.B., Ch.B., Edinburgh; Henry Marcelin Sauzier, M.B., Ch.B., Edinburgh; Thomas Scoresby-Jackson, M.B., Ch.B., Walthamstow; Edward Percy Calder, M.B., Ch.B., Coldingham; Francis Edmond Larkins, M.B., Ch.B., Edinburgh; and Jamshyd Dadabhai Munsiff, F.R.C.S.E., Portobello.

The following gentlemen passed the First Examination in Public Health:—Francis Puis Lauder, Captain, R.A.M.C.; Ferniehirst Halidon Borthwick, M.B., Ch.B., Edinburgh; Sohrab Mancherji Hodiwalla, L.R.C.P. and S.E., Edinburgh; and Thomas Ronaldson Smith, M.B., Ch.B., Edinburgh.

Royal College of Surgeons of Edinburgh

THE following gentlemen, having passed the requisite examinations, were, at a meeting of the College held on 17th inst., admitted Ordinary Fellows:—John Robert Askew, L.R.C.S.E., Fochabers; William Leslie Bennett, M.B., Ch.B., Captain, R.A.M.C.; Bertram Mayhew Bone, M.B., C.M., Marske-by-Sea; Devereux Gwynne-Hughes, L.R.C.S.E., Sydney; H. Astley Knight, M.B., L.R.C.S.E., Lieutenant, I.M.S.; Charles Damien Lochrane, M.B., Ch.B., Glasgow; Arthur Louis Lynch, M.D., C.M., Ottawa; George Bartley M'Kean, M.B., M.R.C.S. (Eng.), Belfast; Maxwell MacKelvie, M.B., Ch.B., Captain, I.M.S.; Edward John Morton, M.B., Ch.B., Edinburgh; Frederick Graham Twigg, M.R.C.S. (Eng.), Denaby Main, near Rotheram; and John Herbert Yearsley, L.R.C.S.E., Edinburgh.

The medal and set of books, presented to the College by Colonel William Lorimer Bathgate, in memory of his late father, William M'Phune Bathgate, F.R.C.S.E., Lecturer on Materia Medica in the Extra-Academical School, was awarded, after the usual competitive written examination in Materia Medica, etc., to John Joseph O'Sullivan, 31 Warrender Park Terrace, Edinburgh.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

DISEASES OF CHILDREN

By JOHN THOMSON, M.D., F.R.C.P.,
Physician, Royal Hospital for Sick Children, Edinburgh

On the Causation and Treatment of the Morbid Condition which produces Infantile Tetany and its associated Neuroses ("Spasmophilie").—There are few diseases so characteristic of infancy as that which gives rise to tetany and laryngismus, to increased irritability of the nerves to mechanical and electrical stimuli, and sometimes also to general convulsions. The close connection between these various clinical phenomena has often been pointed out; and most recent writers have recognised their obvious dependence on a common cause. This has been especially dwelt on in recent years by Heubner,[1] Finkelstein,[2] and Stoeltzner,[3] who have applied the terms "Spasmophil Diathesis" and "Spasmophilie" to the condition. This diathesis is of very common occurrence. Finkelstein finds that the hyper-excitability to galvanism, which he regards as its most important sign, is present in at least 50 per cent. of all young children among the lower classes in Berlin. It will be interesting to know whether it is equally common in other places. It is certainly met with here in a large number of children in all classes.

Various elements in the causation of infantile tetany and its associated neuroses have long been established. It is known, for example, that the patients are practically always rickety, that the more severe of the symptoms generally follow dyspeptic disturbances, especially diarrhœa, and that they are all most frequently met with during the colder months of the year. They have long been known to be very rare indeed in breast-fed babies. Recent investigations into their primary causation seem to indicate that they depend in some way on a special form of derangement of the intermediate tissue-metamorphosis. They set in under a variety of circumstances. The exhaustion which follows chronic wasting diseases of the respiratory and digestive organs or prolonged suppuration predisposes to their occurrence, and they are apt to appear during the onset of acute feverish conditions.

[1] Heubner, *Lehrbuch d. Kinderheilkunde*, Bd. 1, Leipzig, 1903, S. 226.
[2] Finkelstein, *Lehrbuch d. Säuglingskrankheiten*, Berlin, 1905, S. 238.
[3] Stoeltzner, "Die Kinder-Tetanie als Calcium-Vergiftung," *Jahrb. f. Kinderh.*, Bd. 13, H. 6, S. 661, June 11, 1906.

Two kinds of dietetic error are prone to induce them. The first of these is the prolonged use of too much farinaceous food when this has been carried so far that it seriously interferes with nutrition. The other, to which Finkelstein and Stoeltzner draw special attention, and which is apt to be overlooked, is the habitual overfeeding of the child with cow's milk. The fact that this is a powerful cause of "Spasmophilie" probably explains why the vigorous feeding up of rickety babies in hospital often fails entirely to relieve their nervous symptoms.

Some of these children can, indeed, take a large amount of cow's milk without bad effect; but to others it acts, for the time, like a regular poison. This is sometimes strikingly seen when a child who has been on a purely farinaceous diet, and has been keeping free from nervous symptoms, is put suddenly on milk again. When this is done there is apt to be a rapid return of the spasmodic symptoms. Finkelstein records two cases of this kind in which fatal laryngismus resulted from the very first meal of cow's milk.

The power of cow's milk to set up these nervous symptoms being established, Finkelstein set himself to discover which of its constituents was to blame. He found that the addition of the casein of cow's milk, of its butter or its milk sugar to breast-milk failed to cause the nervous phenomena. These were brought on, however, by the addition of the whey as readily as by that of the unaltered milk. He therefore concluded that the cause of the diathesis was to be looked for in the saline constituents of the cow's milk.

Stoeltzner has carried the enquiry a stage further and claims to have shown that the morbid condition is to be regarded as a sort of calcium-poisoning due to the large amount of lime-salts in the cow's milk. He began his investigation by showing that it could not be merely the large proportion of saline constituents in general that did the mischief, because cow's milk produced the symptoms even when diluted with 3 times its bulk of water. And he argued that the harmful constituent must be something which was more than $3\frac{1}{2}$ times as plentiful in cow's as in human milk. This pointed specially to the lime-salts. He therefore began a series of experiments which consisted in adding various salts to the breast-milk with which the babies were being fed and noting which of them altered the galvanic excitability. He found that Phosphate of Soda, Lactate of Iron, Acetate of Potash, Chloride of Sodium and Magnesia were all without any effect of this kind. When, however, he gave Chloride of Lime (or the Acetate, which is a more palatable salt) there was a rapid rise in the galvanic irritability just as there was after taking cow's milk.

He concludes that an infant fed on cow's milk (which contains five times as much lime-salts as human milk) absorbs much more lime than a breast-baby does. This necessitates an abnormally large elimination of lime-salts by the bowel, as that is the channel by which these salts are passed out of the body. When the children are also rickety, this demand on the bowel is further increased; for, while in rachitic infants a large proportion of the absorbed lime is taken up by the bones, in the rickety ones this happens to a much smaller extent and there is therefore more to eliminate. When the intestinal mucous membrane is normal it is capable of dealing, on occasion, with much more than the usual amount of lime. Its powers, however, are limited, and if, from the presence of disease or other cause, it fails, then, according to Stoeltzner, "Spasmophilie" will result.

The question of the treatment of the diathesis is fully dealt with by Finkelstein. It may be considered under two heads—the prevention and the cure.

The best *prophylactic* is certainly breast-milk; but, where this cannot be obtained, careful artificial feeding may be quite successful. For this a sterile diet of proper composition, and especially of proper amount, must be given. Generally speaking, overfeeding is the greatest difficulty when we have to deal with ignorant parents. If a young child is carefully fed, and gets not more than 1½ pints of cow's milk with suitable carbohydrates added early in proper amounts, there will be small risk of the occurrence of these nervous affections. Attention to the general hygiene, including open-air exercise, sunshine, and bathing, is very important.

In the matter of *curative* treatment, the main thing is attention to the general constitutional abnormality. If this is thoroughly seen to, the special nervous manifestations usually need no particular treatment. Breast-milk, when it can be procured, is always very important. In very severe cases, however, even its quantity may have to be limited. When breast-feeding is unattainable, the following indications as to the hand-feeding may be borne in mind.

If the patient is a fat child and has obviously been overfed, and if his digestive organs remain tolerably healthy, he should be put on a spare diet. The milk should be diminished in quantity, and rather more carbohydrate food than usual should be given. If the child is old enough he should have some fresh vegetable. Should this change in the food lessen the gain in weight it does really not matter. If the laryngismus, however, sets in to a serious degree, the amount of milk the child gets must be strictly curtailed. When the case is a very severe and acute one the bowel should be cleared out by repeated small

doses of calomel. The child should then be kept for a day on a vegetable infusion or "tea" of some kind, and thereafter confined to a carbohydrate diet for some days, perhaps even for a week. At the end of this time milk must be very cautiously begun again. Cod-liver oil and phosphorus should also be given.

If the patient is an emaciated child with chronic gastro-intestinal derangement a somewhat different line of treatment is called for. In such patients laryngismus and general convulsions are a less prominent feature, and tetany is more likely to occur. In such cases the improvement of the general nutrition is the chief indication; and our main object is to fatten the child. A purely farinaceous diet may improve the special symptoms, but it should not be persevered with too long. Phosphorus in cod-liver oil (1 in 10,000) should be given continuously for two or three months. Its good effect will be manifest after it has been taken for about a week. In bad cases, Finkelstein recommends bromide, chloral, and morphine to be administered during the intervals. He makes no mention of the use of repeated cold douching, which has been found so useful in this country.

On the Comparative Therapeutic Value of Organic and Inorganic Combinations of Phosphorus.—Phosphorus exists in the body in one or other of two forms, inorganic and organic. The most important of the former is calcium phosphate [$Ca_3(PO_4)_2$], which forms a large part of the bones. The organic combinations are extremely complex bodies, and the most notable of them is lecithin, which is derived from phosphoric acid and glycerine. This substance, "along with its congeners cephaline and protagon, form essential constituents of the nervous system, and are so immediately concerned in its functional activity as to give rise to the dictum that without phosphorus there can be no thought." In tissues other than nervous, we find organic phosphorus compounds in the form of nucleins and nucleo-albumins, especially in the muscles, the thymus and thyroid, the liver, the kidneys, and the spleen.

Seeing that phosphorus in one form or other is present in so many and in such important structures in the body, it is only natural that its therapeutic and dietetic uses have attracted a great deal of attention.

In an interesting paper on this subject[1] Dr Tunnicliffe gives

[1] *Archives Internationales de Pharmacodynamie et de Thérapie*, Vol. xvi. F. 1 and 2, 1906.

a short résumé of the work of pharmacologists on this subject during the last thirty years.

The story, it must be said, is rather a perplexing and disconcerting one from the point of view of the practitioner who looks to the pharmacologist for guidance as to the value of the drugs he uses. For the results of experiments have not seldom been quite conflicting.

In former times inorganic phosphates and hypophosphates enjoyed the unanimous confidence of the medical profession, and they were thought to be of great value in a large number of diseases, especially in childhood. Towards the end of the 19th century this belief was vigorously refuted. It was said that when they were given by the mouth they could afterwards be recovered in undiminished quantities from the fæces. Their use was accordingly condemned as altogether futile. On the other hand, lecithin was found by Danilewsky, in 1895, to have an extraordinarily favourable influence upon nutrition, even when given in the most minute doses. A little later the use of glycero-phosphates was strongly recommended by Bulow and Pascales on the ground that the phosphorus in lecithin was present in this form. Their observations seemed to be strongly confirmed by those of Robin and by Sanson's experiments. The glycero-phosphates came consequently largely into use, especially in France, as nervine tonics and stimulants.

The next class of organic phosphorus compounds to be advocated were those in which the phosphorus is combined with proteids, such as casein. Most observers have found these bodies to be very thoroughly absorbed.

In recent times the decisions of former authorities have been freely disputed by Ehrström and also by Vosgien and Ceroline, who found that inorganic phosphates were absorbed from the alimentary canal and influenced nutrition quite as much as the glycero-phosphates. Keller too found that sodium phosphate, when given to young babies, was largely absorbed, and its phosphorus appropriated by the tissues. He regards it as still unsettled whether organic combinations of phosphorus are absorbed any better than its inorganic salts. Rohrmann and his pupils, on the other hand, have continued to maintain the uselessness of inorganic phosphorus combinations.

In order to reach some more definite conclusions as to the best forms of phosphorus to administer, Dr Tunnicliffe instituted a series of experiments to prove (1) whether in the healthy human child it is possible by increasing the phosphorus of the diet to increase the amount of phosphorus retained in the body; (2) to compare the value as sources of phosphorus to the body of an inorganic and organic phosphorus compound;

and (3) to observe the effect of an inorganic and an organic phosphorus compound upon proteid assimilation.

In his experiments he used as an organic compound the substance known as "sanatogen," which is made up of glycero-phosphoric acid and pure casein. For an inorganic compound he gave calcium phosphate. The experiments were made on two young children.

The general conclusions arrived at are given as follows: (1) In the healthy child the addition of an organic phosphorus compound to the diet is followed by an increase in the amount of phosphorus assimilated by and retained in the body. (2) The addition of an organic phosphorus compound to the diet of children increases the amount of the nitrogen of the food assimilated. (3) The addition of calcium phosphate to the food did not increase the amount of phosphorus assimilated or retained by the child, nor did this compound exert any favourable influence upon the assimilation of the nitrogen of the food. (4) The phosphorus contained in the sodium glycero-phosphate of casein (sanatogen) is practically entirely assimilated by the body.

SURGERY

By C. BALFOUR PAUL, F.R.C.S.,
Assistant Surgeon, Chalmers Hospital, Edinburgh.

THE TREATMENT OF ACUTE PERITONITIS

THE treatment of acute peritonitis is one of those surgical problems about which considerable disagreement exists. Surgeons of experience are found expressing views diametrically opposed to each other, *e.g.*, in washing out the peritoneal cavity. One side advocates, the other deprecates it. Again there is considerable diversity of opinion regarding the treatment of paralytic distension of the intestine, which is not uncommonly met with in advanced stages of peritonitis. Authorities, however, agree as regards the main objects the operation has in view. Shortly these are—(1) To give vent to inflammatory products, *e.g.*, pus, sero-pus; (2) to remove the source of infection as far as possible; (3) to purify the infected region of the abdomen. The difference of opinion, therefore, is more connected with the methods of carrying out these principles.

In the early part of the year, Professor Lennander of Upsala published a paper on the treatment of acute peritonitis (*Deutsche Zeitschrift für Chirurgie*, January 1906), which was delivered at the First International Surgical Congress at Brussels.

In this interesting paper, he gives a comprehensive description of the treatment of this condition. It is in connection with paralytic distension that this abstract chiefly deals, the radical treatment of which Lennander discusses at some length.

While the virulence of the bacterial invasion is primarily the causative agent in the production of the phenomena that occur during peritonitis, and against which surgical efforts are mainly directed, paralysis of the bowel is one of the most serious and dangerous complications that can arise. Certain death awaits the patient unless something is done promptly to restore the normal peristalsis. It occurs as a result of toxic poisoning of the intestinal walls, changes being seen in the lymphatics and in the cells of Auerbach's plexus (Askanazy and Walbauer). These observers have shown experimentally that contractions of the muscular coats of the intestine cease whenever the normal relationship with the plexus is interfered with. Auerbach's plexus therefore plays an important part in peristalsis. The latter normally depends on the mechanical and chemical properties of the intestinal contents, which exert an irritative action on the intestinal mucous membrane. This is referred to Auerbach's plexus, from which co-ordinated impulses pass to the bowel. The plexus is situated between the muscular layers. By infection of the peritoneal coat lymphangitis occurs in the intestinal wall, by which the passage of bacteria and their toxines is aided to the plexus. Complete destruction of the plexus renders peristalsis impossible. Fæcal contents collect in the bowel, stagnate, their toxicity is increased, distension takes place, and the train of symptoms which culminate in thrombosis, gangrene, etc., is set up.

When the colon or the pelvic colon is the part distended, relief can be obtained by the passage per rectum of a tube, but if the cæcum or small intestine are paralysed, relief can only be obtained by opening the bowel. The question then arises, What is the best way of emptying the bowel, and is the incision in it to be stitched up at once (enterotomy), or is a tube to be inserted through it (enterostomy)? If the coils of intestine protrude through the abdominal incision, or have to be brought out of the wound, Lennander incises the bowel in a sufficient number of places to allow of enough escape of gas to permit of their return; formerly he used to close the small incisions and return the bowel, but in his experience now he finds it better to insert a tube into each opening. Even in 1893 he made it a rule to insert a tube into the cæcum when there was paralytic distension of the small intestine, or in cases of doubt he stitched the cæcum to the abdominal wound and opened it subsequently if necessary.

In 1903 Dahlgren introduced the method of emptying the bowel by "milking." He described the process at the Surgical Congress thus:—A coil near the centre of the small intestine is identified; a transverse incision, 1 to 1.5 cm. long, is made in it and the edges seized in forceps. An assistant holds the loop, and the rest of the peritoneal cavity being protected, the operator proceeds to "milk" the bowel, *i.e.* by regular movements the intestine is gently massaged, so that the contents are propelled towards the incised portion, through which they escape. The milking is first begun at a distance of about 1 foot from the opening, and is gradually continued up to near the duodeno-jejunal flexure, and down to the ileo-cæcal valve. The bowel is held between the index and middle fingers of both hands, the one hand following behind the other; the bowel is freely washed with saline meanwhile. Dahlgren carried out the process in eight cases of acute peritonitis with distension with four successes, and he states that many patients can be saved in this way. He has lately brought out an instrument by which the bowel can be "milked."

Lennander believes his early deaths from opening the bowel were due to faulty technique, and now makes the fæcal fistulæ according to the method of performing gastrostomy advocated by Witzel, or when this is impossible by using Senn or Kader's method of introducing the tube. The tube, which in the case of the small intestine is composed of soft flexible rubber at most 3 mm. in diameter, and for the cæcum 3 to 6 mm. in diameter, emerges from an oblique opening, and is fixed to the intestinal wall by two sutures. In one case in which a firmer tube was employed death resulted. Two or three such tubes should be inserted in this manner, and are retained only till peristalsis is renewed. It is therefore essential that one tube should be placed on the proximal (oral) side of the paralysed bowel, so that the contents (bile, etc.) may freely escape without passing down and becoming stagnant in the paretic portion. When the whole of the small intestine is paretic the highest tube is inserted close to the duodeno-jejunal flexure.

Lennander occasionally employs a modification of Dahlgren's method. When there is only partial paralysis, *i.e.* localised, he identifies the central part of the paralysed portion and inserts there a Witzel tube. The opening here is therefore nearer the cæcum than is the case when Dahlgren's original process is used. In every case of extensive paresis the bowel should be incised at once, emptied, and at least three Witzel tubes inserted, one above the paralysed section, one in it, and the third at the cæcum.

As regards the after-treatment of the tubes, the most

proximal one is daily plugged in order to see if there is free escape from the next tube. Should this occur, it is a sign that peristalsis is returning. If the improvement continues, the proximal tube is then removed, and the fistula closed by a fine purse-string suture. The other tubes are dealt with similarly. The tube in the cæcum is of great importance. As a rule, the colon is the least affected portion of gut, and its mucosa can be utilised for absorption. Large quantities of water, with glucose, medicines (digitalis) can be administered through it.

When it is apparent that a portion of the gut is not going to become permeable, and that the fæcal fistula is to be permanent, anastomosis or resection has to be considered. It is bad practice to forcibly replace distended paretic gut and close the abdominal wound. For the gut to recover it must have plenty room for peristaltic movements. It is better rather to have it outside the abdomen wrapped up in a towel; recovery can occur even then. Also, if after emptying the bowel, it cannot all be returned into the abdomen, the most affected coil should be wrapped up in a towel and kept outside the abdomen, while a Witzel tube is inserted immediately above it. The loop can subsequently be resected.

Space forbids further consideration of Lennander's paper, but we may shortly summarise the conclusions to be drawn :—

1. Success in the treatment of acute peritonitis depends largely upon
   (*a*) Early and accurate diagnosis; (*b*) early operation, before the infection is general and distension is marked.
2. The cause should always be removed if possible.
3. When paralytic distension of the intestines is present, the following methods of treatment have to be considered :—
   (*a*) Enterotomy with emptying of the bowel, one or several incisions.
   (*b*) Enterostomy—the tubes to be inserted according to Witzel's method, and one to be always placed in the cæcum.
   (*c*) Resection.
4. When the peritonitis is due to appendicitis with paresis of the cæcum, and the terminal portion of the ileum, Witzel's enterostomy is to be made in the cæcum, or the latter sutured to the abdominal wall and opened later if the symptoms of distension do not pass off.
5. When the central region of the peritoneal cavity is affected, washing out of the inflamed area should be performed with saline solution. It is wrong to involve other parts where the peritoneum is not infected in the washing out process.

6. It is advantageous after having washed out the peritoneum to introduce some saline, as it causes a beneficial leucocytosis.

7. Acutely inflamed peritoneal surfaces should be drained, best in either loin.

8. An assistant should always be at hand to perform intravenous infusion of saline solution. Infusion should always be carried out when it is necessary to eviscerate.

9. In the after treatment everything should be done to procure normal return of function in the stomach and intestines, *e.g.* washing out the rectum, stomach, colon, the latter through the enterotomy. Suitable drugs can be administered to ensure the bowels moving, *e.g.* hypodermic injections of strychnine, physostigmine, atropin. The former acts also as a cardiac tonic. Physostigmine is administered in doses of ½-1 mgr. once or twice a day 15 to 30 minutes before washing out the bowel.

10. The loss of fluid the body has sustained should be made up by injecting 1200-2000 c.c. of saline in 24 hours either by rectum, fistulæ, subcutaneous or intravenous infusion.

11. The best nourishment is obtained by giving glucose, by rectum or otherwise. Peptonised food can be administered through the tube into the cæcum.

12. The patient can be nourished by subcutaneous injections for several days. 100-200 g. olive oil, 160 g. glucose, 40 g. alcohol (2 litres of saline with 8 per cent. glucose and 2 per cent. spirit) can be given in 24 hours.

13. Adhesions with kinking and obstruction of the bowels should always be borne in mind after septic peritonitis. It is unwise therefore to begin feeding by the mouth too early, as the fluids, etc., may become arrested and cause distension with stagnation.

14. Finally, it is important for every patient after operation for acute peritonitis to take care that the bowels move regularly every day.

OBSTETRICS

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DECHLORIDATION TREATMENT IN DROPSY

IN view of the fact that the paper with this title in the February number of this journal was the first extensive notice of this subject in British medical literature, it may be of interest to give now an account of the first experiences of the method recorded in the obstetric field.

The first paper is by Biancardi (*Ann. Ostet. e. Gin.*, 1905, 2, 641), and gives the history of eight patients who were under observation long enough to afford an opportunity of judging the effect of a chloride free diet on their progress. Four were cases of recrudescent parenchymatous nephritis, three of acute nephritis, and one of albuminuria of pregnancy. The aliments experimented with were milk, undiluted and diluted, rice soup, rice, bread, egg, butter, sugar, meat raw or roasted. The details are set out in tables giving the analytical values of the diet, the dosage of salt ingested and excreted, albumen, quantity of urine and its density, urea in two cases and the clinical facts of the cases. The author's summary is a fair description of the facts. Dechloridation is of considerable advantage in nephritis and albuminuria of pregnancy. It has an indisputable effect in the disappearance of œdema and subjective disturbances, and finds its indication especially when there is chloride retention, pulmonary œdema and deep infiltration. It has less influence on the albuminuria, which is more affected by the termination of pregnancy. Meat without salt may be given in an albuminuria without renal lesion and with caution in some cases of nephritis. The chloride free diet which best answers in nephritis and albuminuria of pregnancy consists of milk, carbohydrate (rice, potato, vegetables), fat (eggs and butter), with, in given cases, meat.

Some features of the individual cases will be of interest.

1. Primipara of 22, in sixth month, with recrudescent parenchymatous nephritis. Œdema, albumen, and subjective disturbances had disappeared on milk only diet. She was put on mixed diet and these symptoms all reappeared, and less than the daily ingest of sodium chloride was excreted. She was then put on the same diet without salt and two gm. of diuretin; the excreted salt at once rose above the preceding daily amount, and this continued till the record ends with spontaneous delivery of a macerated fœtus.

2. Primipara of 18, in seventh month, with chronic parenchymatous nephritis. Showed excess of chloride excrete on milk only diet; this continued when mixed diet was given without salt, and when salt was added to it the excess of excreted salt diminished until after her delivery of a living child.

3. Eighth pregnancy, seventh month. Acute epithelial nephritis. Daily accumulation of salt retained till salt was omitted from the diet, when there was an excess excretion and disappearance of the œdema. The excreted amounts here also were in excess of those, while salt was freely ingested. Diuretin promptly increased the quantity of urine.

4. Second pregnancy, seventh month, chronic parenchy-

matous nephritis. Showed marked chloride retention on mixed diet. On chloride free diet and diuretin the quantity of urine more than doubled and there was marked excess of chloride excrete. Œdema and headache promptly disappeared.

5. Third pregnancy, sixth month, recrudescent parenchymatous nephritis. Milk only diet gave an excess of chloride excrete which continued on salt free mixed diet. She got very thin, and as the albuminuria was not improving premature labour was induced. The patient died some time after in a medical ward.

6. Primipara, eighth month, acute nephritis with threatening eclampsia. On milk only the headache disappeared and there was excess of chloride excretion, which was lessened when she was put on chloride free mixed diet. Labour was induced on account of the severe albuminuria.

7. Primipara, eighth month, albuminuria of pregnancy. Excess of chloride excrete on milk only was increased when she was put on salt free mixed diet, including meat. Chloride retention set in at once when salt was added to the diet.

8. Primipara, eighth month, epithelial nephritis. Excess of chloride excrete on milk only increased on change to mixed salt free diet. Diuretin had no effect on the small quantity of the urine, but this seems in itself to have been dependent on a restricted fluid ingest. The œdema and other symptoms gradually disappeared.

The second paper is by H. Cramer of Bonn (*Monats. f. Geburtshülfe u. Gyn.*, 1906, xxxiii. 437), and deals with five cases.

1. A primipara of 23 years came under observation six months after her last period. She was found to be pregnant in each of two uteri. She had marked œdema, which did not disappear in the night, and had begun to affect the face. The urine at this time, and for two months more, was free from albumen. For three days before treatment was begun there was a daily average excess of fluid ingest over urine of 200 c.c. She was put on a diet free from added salt, and excluding also milk and flesh, her table consisting of tea, cocoa, malt coffee, gruel, fruit, lemonade, rice, bran, potato, sago, flour, salad, pudding, fresh vegetables and fruit, salt free bread, washed butter, and daily two eggs. During sixteen days she continued this, with a slight excess of urine over the fluid ingest. The dropsy had much improved, the swelling of the legs disappearing in the night. She had lost 4 lbs. in weight. Albuminuria had now appeared, and the patient was complaining much of the restricted diet, so some meat and milk were added. She, on her own responsibility, took further liberties, and the fluid

balance was reversed, the albuminuria increased, and the dropsy rapidly reappeared, so that she, again of her own accord, closely restricted her diet. This was only three days before delivery. The fluid balance again swung over. She had marked premonitory symptoms of eclampsia, but no fits. The left uterus began to contract, and four hours later, the right. After eight hours the left child was delivered with forceps; the right by turning. The second child showed signs of immaturity, but both, as well as the mother, did well.

2. v-para, of 36 years, whose previous pregnancies had been normal, came under observation seven months pregnant, and complaining of swelling of feet and hands, and of numbness. She showed marked general dropsy, but had no albuminuria throughout. After eighteen days of salt free diet the numbness had gone, and there was only slight œdema of the ankles in the evening. She had lost 4 lbs. She relaxed her restrictions, and in twelve days the dropsy was again severe, and she was 5 lbs. heavier. With the addition of half a litre of milk the salt free diet was again adopted, and was followed by the rapid disappearance of the dropsy. Delivery and puerperium were normal.

3. Primipara, of 40 years; nineteen years married, came under observation for swelling. She was found to be eight months pregnant; had marked œdema of the feet and legs, but no albuminuria. In fifteen days of the salt free diet she lost 2 lbs., and the œdema had entirely disappeared. With a litre of milk added to the list she kept to the dietary till delivery, three weeks later. Forceps delivery after nine hours.

4. iv-para, 43 years, eight months pregnant; complained of difficulty of walking and of prinkling in the feet. She had severe varicosity and marked œdema of the legs. In eighteen days on salt free diet she lost 2 lbs. in weight, and the œdema disappeared. Delivery easy, and progress normal.

5. The fifth patient in her first pregnancy four years before had severe albuminuria with casts, and the pregnancy ended in the eighth month with the birth of a macerated child. In the second she came under observation at the sixth month with marked œdema of the legs, severe albuminuria with casts, and some cardiac dilatation. Put on digitalis she showed no marked difference. The salt free diet was then ordered, but owing to the fear of the patient that she would lose strength, was not closely followed. There was no improvement, and she was then induced to keep to the dietary and milk. The result was brilliant. In two weeks the œdema had practically disappeared, though the albuminuria persisted. At delivery there

was prolapse of the cord, and the child was delivered by turning, but was dead.

Menstruation during Lactation. Karl Heil (*Monats. f. Geburtshülfe u. Gyn.*, 1906, xxiii. 340) returns to an old discussion with the contention that menstruation during lactation should not be considered abnormal. His material is found in the histories of 200 women, with, in all, 540 deliveries. 125 had experienced the onset of menstruation while they were lactating. In 234 of 499 lactations the periods were re-established before weaning, the time distribution being as follows:—First six weeks, 37; second six weeks, 62; three to twelve months, 100; later, 4; (31 were indefinite). He gives a tabular statement of the duration of lactation in the hundred women whose periods returned from three months to a year after delivery. The table shows the influence of the belief that lactation must be stopped if the periods return, the rule being obeyed in 17 cases. Of the lactation months recorded from 53 per cent. to 60 per cent. were amenorrheic, the variation depending on the way in which the figures are to be interpreted. On some thirty occasions pregnancy had occurred during lactation, usually, but not always, after the periods had returned. With regard to the argument of this paper it is not necessary to deny the fact that menstruation frequently returns during lactation, although its validity as a basis for rules of practice may be contested. The question whether it is physiologically advantageous to continue lactation after menstruation has been re-established, must be settled by evidence of quite another kind.

OPHTHALMOLOGY

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BACTERIOLOGY OF THE EYE

DURING the past few years considerable attention has been paid to the bacteriology of the eye, especially with a view to arriving at a scientific classification of conjunctival and corneal affections. The etiological factor of several affections has already been ascertained, but a good deal still remains to be done before we can safely drop the old empirical classification so dear to the heart of the last generation of ophthalmic surgeons.

As fresh research is always welcomed, we purpose giving a short résumé of the work done during the past year or so in this important field.

Dr A. Duane, of New York, has been working at the symptoms presented by the different bacteriological types of acute conjunctivitis, and, in an interesting paper read by him before the American Ophthalmological Society, he records the results of an exhaustive examination of 132 cases of conjunctivitis, together with the pathological reports made by Dr T. W. Hastings. The object of the investigation was to ascertain as far as possible (*a*) the prevailing types of bacterial infection in conjunctivitis, (*b*) the relation between the bacteriological types present and the clinical symptoms. His conclusions are as follows: 1. There is no special type of conjunctivitis associated with any germ. The clinical picture, therefore, affords no clue to the germ causing the inflammation. 2. Membranous conjunctivitis, as is well known, may be caused by a variety of micro-organisms. It does not necessarily indicate a severe inflammation or one that will produce other evidences of excessive reaction beside the false membrane. 3. In trachoma, especially in the stage of acute exacerbation, a variety of organisms may be present. They are not, however, the cause of the trachoma, but cause a conjunctivitis, with secretion, which latter can act as a carrier of contagion, disseminating the conjunctivitis and the trachoma as well. 4. The staphylococcus albus, and especially the aureus, are distinctly pathogenic, and predispose to the production of corneal lesions. 5. Very mixed infections seem, if anything, to be rather less severe than those in which one germ is predominant.

On the other hand, Poulard (*Archives d'Ophtalmologie*, Oct. 1905) shows that the staphylococcic infection, formerly considered a frequent cause of conjunctivitis, has lost its exaggerated importance in proportion as the etiology of conjunctivitis has been more definitely determined. It is not that the presence of staphylococci in the conjunctiva is rare, for it is met with in many conjunctival affections, and even sometimes in the cul-de-sac of the healthy conjunctiva.

Poulard further shows that among the affections of the conjunctiva there are some whose secretion never contains the staphylococcus. Morax has never found it in the numerous cases of acute contagious and blenorrhagic conjunctivitis whose secretions he has cultivated. Poulard has met with it only exceptionally in those forms of conjunctivitis, though it is more frequent in conjunctivitis from the diplobacillus, particularly in old cases. In all these forms of conjunctivitis the staphylococcus is not more frequent than in the healthy conjunctiva.

Its presence is frequent in phlyctenular conjunctivitis, but the author says there is no good reason to suppose that it is its cause. The variableness of its presence in these affections, its fewness, and the existence, with or without it, of other germs, do not tend to attribute to the staphylococcus a pathogenic rôle.

There are other forms of conjunctivitis, however, in which the staphylococcus really does exercise a pathogenic action. Poulard reports eight cases of staphylococcic infection of the conjunctiva, occurring at the Hôtel Dieu, which are distinguished from other infections by their clinical aspect, their evolution, the etiological conditions of their appearance, and the existence in the secretion of an abundance of staphylococci.

The author further points out that after or during the evolution of palpebral affections, as hordeolum, etc., all the symptoms of an acute conjunctivitis disappear. A yellowish, viscid, mucopurulent secretion forms in the cul-de-sac, matting the lashes and covering the surface of the conjunctiva with a fine, easily-detachable pellicle. The pre-auricular glands are swollen and tender, the cornea remains intact. Culture of the secretion gives colonies of staphylococcus. The majority of cases of hordeolum and other palpebral affections are not accompanied by conjunctivitis, even although staphylococci may be found in the cul-de-sac. The staphylococcus, like the streptococcus, the pneumococcus, and some other microbes, may exist in the conjunctiva without having any pathogenic effect, differing in this from the bacillus of Weeks, the diplococcus of Morax, and the gonococcus, which inevitably cause conjunctivitis. Other conditions which are not yet well determined are required for the staphylococcus to produce an inflammation of the conjunctiva. The infection, Poulard thinks, is promoted by a pre-existing conjunctivitis or a mechanical injury of the conjunctival cul-de-sac.

In an important paper (*Journal of American Medical Association*, December 23, 1905), Dr Swan W. Burnett of Washington brings the subject of the inflammation of the eye, due to the toxins of the gonococcus, more closely to the attention of the general practitioner and to the specialist in genito-urinary diseases. The writer points out that it seems singular and altogether unaccountable that, while gonorrhœal iritis finds a place in every text-book on diseases of the eye, it is ignored in all but two of the treatises on genito-urinary affections. There is much difference of opinion as to its frequency, which may be accounted for by the fact that the complication is more common in some localities than in others, or by a failure of some clinicians to inquire into the existence of gonorrhœa in the cases of iritis

they see. The iritis may be of the spongy type, with a gelatinous exudation in the anterior chamber, or it may be similar to any of the forms of plastic iritis. Burnett reports a case of iritis associated with pain and swelling in the joints of the big toe. Conjunctivitis due to an endogenous infection of gonorrhœal toxins is rare and is questioned by some. The author reports a case which might easily be classed as an ordinary gonorrhœal infection of the conjunctiva had the discharge not been examined bacteriologically and found sterile. The discharge was mucopurulent and stringy, but not creamy. During the attack there was pain and tenderness of the ligaments of the right knee.

With regard to the clinical importance of the Diplobacillus of Morax and Axenfeld, Dr Clifford, Omaha, Neb., states (*The Ophthalmic Record*, November 1905) that this germ has not received the attention in America which it deserves It is responsible for ulceration of the cornea of a most stubborn type. The conjunctiva may be acutely or chronically inflamed from this germ, or the patient may experience scarcely any symptoms, except itching or fatigue of the eyes at night. The local appearances may not show anything beyond evidences of local irritation. Secretion, if carefully looked for, may be found in small quantity at the inner canthus. This secretion will be found swarming with the diplobacillus. The treatment should consist in the use of chloride or sulphate of zinc, the latter in 1 per cent. solution, the chloride in a quarter to two per cent. solution.

Dr M'Kee, Hanford, reports a case of ulceration of the cornea from the diplobacillus of Morax-Axenfeld (*Montreal Medical Journal*, April 1906). The case is of interest chiefly from the result obtained by most conservative treatment. The condition of the affected eye was as follows: Marked blepharo-conjunctivitis, œdema of the bulbar conjunctiva, the surface of the cornea over its central third showed deep ulceration with a large hypopyon, iris was dull, severe chemosis, pupil contracted. Vision reduced to perception of light only, tension normal. The patient said he had sore eyes all his life, the edges of the lids being always red, and the eyes generally watery.

A smear was made from the surface of the ulcer and from the conjunctival sac, and tubes were immediately inoculated. From the surface of the ulcer diplobacilli were found, and were the only organism seen. From the conjunctival sac the diplobacilli were found associated with the xerosis bacillus and the staphylococcus pyogenes albus.

The treatment received was as follows: Instillations of

scopolamin; of zinc sulphate, one grain to the ounce; frequent irrigations with warm boracic solution. Rapid progress was made, the chemosis disappeared, the ulceration healed, and the patient had a very useful eye. Vision was restored to two-thirds of the normal. The author states that in Montreal he has seen 70 cases of diplobacillary conjunctivitis, and on two occasions ulceration of the cornea.

Bietti, in a paper on bacteriological researches in hypopyon keratitis (*Ophthalmology*, July 1906), found in one case the b. pyocyaneus, the other the colon bacillus. In the case of the b. pyocyaneus the clinical course was not violent enough to produce panophthalmitis, as has been observed in such cases. On inoculating the cornea of a rabbit with the organism without perforation of the anterior chamber, the writer obtained an abscess which was followed by ulceration. In the anterior chamber the bacillus set up panophthalmitis. In the case of the colon bacillus the clinical course was still more benign. After cauterising the ulcer with the galvano-cautery it showed a tendency to heal, and the hypopyon was absorbed spontaneously. The final result was a leucoma of the cornea.

With a view of studying the bacteriological affections which appear a few days after operations on the eyeball, Duclos (*Annales d'Oculistique*, December 1905) made careful examination in nine cases of infection after cataract extraction. He examined, first, the tears and particularly the mucous filaments floating in the conjunctival fluid; second, the pus found on the margins of the wound; third, the pus in the anterior chamber; fourth, the intraocular pus, when enucleation had been performed; fifth, sometimes the pus remaining at the bottom of the cavity several days after the evisceration; and sixth, in some cases the discharge from the naso-pharyngeal passages.

Duclos concludes that the most frequent agents of post-operative infection are pneumococci and streptococci; that the infection is exogenous and always begins at the margin of the wound; that, from a clinical point of view, the suppuration due to the pneumococci is characterised by a rather dense whitish slough extending towards the vitreous, while that due to streptococci, causing an abundant conjunctival secretion, appears as an ill-defined infiltration of the whole cornea.

There was no albumin or sugar in the urine of any of the cases. Some of the patients were the subjects of a chronic conjunctival or palpebral irritation; nearly all had epiphora. The infection often appears in the course of a coryza, and the most

severe cases coincide with an attack of influenza. The infection may appear at any time before cicatrisation is complete. Operative safety depends upon asepsis of instruments, hands, and dressings, and a normal condition of the mucous membrane.

OTOLOGY

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SUPPURATIVE THROMBOSIS OF THE SUPERIOR LONGITUDINAL SINUS

GRADENIGO draws attention (*Archiv für Ohrenheilkunde*, Band 66) to a characteristic symptom, which, when present, permits of a diagnosis in this condition which is so frequently undiagnosed. It consists in the presence of a painful, fluctuating swelling in the middle line of the vertex, near the posterior end of the sagittal suture and corresponding to the exit of one of the emissary veins. This swelling may contain either blood or pus and granulations. An exceedingly interesting case in which this symptom occurred is described at length.

The patient was a woman aged 31. Since her marriage at the age of 27 she had had two miscarriages and two healthy children. In the beginning of April 1904, she had an acute right-sided otitis media, with severe pain in the ear and right side of the head, but without any discharge from the meatus. A little later a red painful swelling appeared behind the ear. This swelling burst and discharged pus, the pain ceasing thereafter. A little later a swelling was noticed on the top of the head. This swelling was painful on pressure, and there was also spontaneous pain, which gradually increased in severity. On account of this the patient came to Gradenigo's clinic, and was admitted on 6th July 1904.

The following was her condition on admission:—She was pale, badly nourished, and looked very ill. Below and in front of the right mastoid process there was a fistula from which pus exuded on pressure. No denuded bone could be felt. The external auditory meatus contained no pus. The tympanic membrane lacked lustre, but there was no perforation. Hearing was normal. The left ear, nose, and pharynx were normal. Enlarged cervical glands were present on both sides. The left epitrochlear gland was palpable. A swelling was present in the middle line of the vertex, extending slightly more to the right

side than to the left, and corresponding to the posterior part of the sagittal suture. It was of the size of half a nut, roundish, and covered by unchanged skin. It was soft, fluctuating, tender, and sufficiently painful to prevent sleep.

The history of miscarriages, the presence of enlarged glands, and the persistent head pain led to a diagnosis of gumma of the parietal bone. Iodide of potassium was therefore administered without, however, any effect on the pain. The swelling increased, and became surrounded by an œdematous zone, the œdema quickly spreading to the forehead and eyelids. Pupils, fundi, and nervous system were normal. The mastoid fistula closed in spite of efforts to maintain it patent. The temperature, which previously had not been above 37·8° C., was on 10th July 38° C.

On 11th July, with the patient under general anæsthesia, the swelling on the vertex was incised and pus evacuated. A layer of granulations was found covering the aponeurosis. The granulations were removed. No bare bone could be felt. Pain continued after the operation. During the after-treatment pus was seen to be oozing from a small opening in the aponeurosis. On passing a probe through this opening carious bone was detected.

On 19th July the patient was again anæsthetized. On turning aside the periosteum an area of bone of the size of a two-franc piece and situated in the middle line at the posterior part of the sagittal suture was found covered with dark-coloured granulations. The bone was carious, and at the posterior margin, somewhat to the right side, a fistula was found through which a probe could be introduced into the cranial cavity. The diseased bone was removed. The portion of dura mater corresponding to it was covered with granulations, in the centre of which an opening was found through which a probe could be passed in a direction somewhat forwards and to the right. The introduction of the probe produced a copious discharge of pus. On incising the dura mater along the probe, it was found that the superior longitudinal sinus had been entered, and that it contained a blood-red clot. As there had been no definite pyæmic symptoms the clot was left *in situ*, a portion of the sinus wall was removed, and the wound plugged.

After the operation the condition of the patient became worse. The headache increased, the temperature rose, and symptoms of meningitis appeared, the patient dying comatose on 28th July.

At the autopsy it was found that the lumen of the superior longitudinal sinus was patent in its anterior portion, and almost as far back as the lesion of the dura. From this point a purulent

thrombus extended back to the torcular herophili. The thrombotic condition extended along the whole of the right lateral sinus, and along about half the length of the left lateral sinus. The other sinuses were normal, as were the jugular veins. In the upper part of the right sulcus sigmoideus, in the neighbourhood of the knee, an oval defect was found, through which a probe could be passed into a few suppurating mastoid cells. Diffuse suppurative meningitis was present. On examination of the right temporal bone the membrana tympani, the tympanum, including its vestibular wall, and the antrum were healthy, and were not in communication with the suppurating mastoid cells.

Gradenigo cites a case of purulent thrombosis of the superior longitudinal sinus, which was published by De Carli. In this a swelling occurred in the same position as in Gradenigo's case. On incision, however, blood only was evacuated.

The Treatment of Post-Operative Hæmorrhage from the Palatal Tonsil.—Constantin of Toulouse contributes an interesting paper on this subject to the February issue of *Annales des Maladies de l'Oreille, du Larynx, du Nez, et du Pharynx.* He has reviewed the literature of the last twelve years, and finds that no one of the many methods in vogue for the diminution of hypertrophied tonsillar tissue is free from risk of hæmorrhage. Even the galvano-caustic procedures, which are particularly free from hæmorrhage at the time of operation, expose the patient to risks of serious secondary hæmorrhage. In view of this finding Constantin deems it of prime importance that the surgeon who operates on enlarged tonsils should be armed with methods of hæmostasis simple, certain, and rapidly applicable.

After enumerating the usual chemical styptics, other methods of hæmostasis are reviewed. That by producing syncope Constantin considers barbarous, and prefers to it the plan tried by Wharton Hood of producing emesis. Cauterisation by actual or galvanic cautery is superior to the chemical methods. Compression in its various forms is next considered. Digital or instrumental pressure on the carotid is sometimes useful. As a substitute for the various instruments intended to exert pressure on the tonsillar wound an appliance suggested by Escat is described.

Constantin describes it somewhat as follows: The form of this apparatus suggests a marine anchor. It consists of a hook formed of a triangular metal plate, the summit of which is provided with an eyelet. This plate corresponds to the shank of the anchor, the eyelet to the anchor ring. The concave anterior

aspect of the shank rests against the convex posterior surface of the soft palate, whilst the base of it is curved forwards, and ends in two wings, which correspond to the arms and flukes of the anchor. These wings come to lie on the lateral limits of the buccal aspect of the palate, above the insertion of the anterior pillars. They are situated in a plane oblique to that of the shank, and more anteriorly, like the arms of the Porter anchor. In the space which separates them the uvula hangs freely. Each wing is continued downwards and outwards in the form of a groove with its concavity towards the tonsillar fossa, and of sufficient width to enclose the tonsillar fossa and faucial pillars. Each groove is filled with an antiseptic compress. A cord which is passed through the nose into the mouth is then attached to the eyelet of the hook. The cord is pulled upon and the apparatus manipulated into position, when the antiseptic pads will, if sufficiently large, exercise the required pressure on the tonsillar wounds. The apparatus is fixed in position by attaching the cord outside the anterior nares. Briefly, the object of the apparatus is to exert direct pressure on the tonsillar wound for any required time without interfering with the patient's respiration or nutrition.

Close suture of the anterior to the posterior pillar, combined with plugging of the tonsillar fossa, Constantin considers a very useful process. Nikoladoni's plan, however, of suturing the pillars through an external incision he considers difficult. It has, moreover, other drawbacks, in that it requires assistance and conditions of asepsis and general anæsthesia not always available.

As a substitute for ligature of the carotid, von Holst suggested plugging of the pharynx after a preliminary tracheotomy. The performance of this latter operation upon a patient already in a grave condition did not seem to Escat and others to be desirable. Escat has accordingly devised a method of plugging without preliminary tracheotomy. For this purpose a laryngeal tube which shall be absolutely rigid, which shall completely close the upper orifice of the larynx, which shall be readily introduced, and which shall maintain the required position, is necessary. Escat has had such an one made. It is a metal tube, with a curve similar to that of endo-laryngeal instruments made in France or Germany. The terminal laryngeal part is of the shape of an ordinary intubation tube. The neck of the tube, which will lie in the rima glottidis, is surmounted by a conical head, which has a large superior base and which is of a much greater length than the head of an ordinary intubation tube. This conformation of the head of the tube is designed to occlude completely the upper openings of larynges of various

sizes. There is a rapid diminution in the size of the tube just above the head, its purpose being to favour the maintenance of the tube in position by the pressure of the pharyngeal tampon on the head. The buccal portion of the tube is cylindrical. Near its external end there is a sliding portion provided with two rings. This sliding portion can be moved backwards and forwards for a distance of about four centimetres. To the rings are attached tapes which serve to fix the tube in position. Into the end of the tube a fenestrated obturator is screwed. There is also a detachable handle, which is used for introducing the tube.

The method of use is as follows: The handle being fixed on the tube, the operator holds it with the right hand, whilst the left index finger is used to raise the epiglottis. The tube is then introduced along this finger. Whilst an assistant holds it in position the operator introduces into the œsophagus a small œsophageal tube. The pharynx is then plugged with sterilised gauze, the handle of the tube removed, the obturator screwed in, the œsophageal tube attached to one of the rings on the sliding portion, and the tapes fastened at the back of the neck.

It remains to be shown whether this apparatus will prove satisfactory.

Laryngeal Tuberculosis and Pregnancy.—His attention having been drawn by a communication of Kuttner's to the subject of the evolution of laryngeal tubercle in the pregnant woman, Felix, of Bucharest, has searched the literature, and has collected particulars regarding eighty cases. He gives a resumé of these, and adds two cases of his own (*Ann. des Mal. de l'Oreille*, etc.).

His first case was a woman aged 24 years. She was first seen by Felix in the eighth month of her first pregnancy, and gave a history of cough for a year, loss of flesh for about six months, hoarseness for four months, and for a few weeks had had severe pain on swallowing. Her father had died tuberculous. On examination of the larynx, infiltration of the epiglottis and interarytenoid region was found. The free border of the epiglottis was ulcerated near the middle line. The epiglottis prevented a satisfactory view of the interior of the larynx. The apex of the left lung showed signs of infiltration. There was no fever. The patient died ten days after confinement at term. The child, a puny infant, lived six weeks.

The second case was that of a secundipara, aged 28, seen towards the end of the eighth month. No family history of tubercle. For two months she had been hoarse, and had had slight difficulty in swallowing, but no pain. On examination there was found infiltration of the epiglottis and arytenoids,

but no ulceration. No evidence of pulmonary tubercle. About two months after her confinement this patient was again examined. Hoarseness was still present, and the condition of the larynx was unchanged. She was not seen again by Felix.

Of the eighty-two cases dealt with in Felix's paper, twenty-four were first pregnancies, ten were second pregnancies, four were third pregnancies, five were fourth pregnancies, four were fifth pregnancies, four were sixth pregnancies, two were seventh pregnancies, one was an eighth pregnancy, one was a ninth pregnancy, and two were tenth pregnancies. In twenty-five cases the number of the pregnancy was not stated. In only three patients were signs of pulmonary tubercle completely wanting.

As regards the time of onset of tuberculous laryngitis, this could not be determined accurately, but for statistical purposes it has been regarded, with the exception of a few cases in which medical examination had determined the presence of the laryngeal lesion, as the period at which the patient first noticed laryngeal symptoms. On this basis, Felix finds that tubercular laryngitis had existed before pregnancy in seventeen cases. In fifteen cases its onset was simultaneous with that of pregnancy. In twenty-five cases it occurred during the first half of pregnancy, and in twelve in the second half. In the remaining cases no mention is made of the period of onset.

A family history of tubercle was found in ten cases. In nineteen cases there was no such taint, whilst in the reports of the remaining fifty-three cases heredity is not dealt with.

Delivery was spontaneous in fifty cases, in four it was artificially induced, and in one case Cæsarean section was performed. In twenty-seven cases no information is forthcoming on this point.

The maternal mortality was a very heavy one. Sixty-three mothers died before, during, or soon after confinement. Of these, four died before and two died during their confinement. Twelve died within a week after confinement, other twenty-nine died within a month, and other eleven within six months. Of the remainder, one lived seven months, two a year and a half, one twenty months, and one "a short time." Fourteen mothers were alive when last heard of. In five cases no information is available.

Tracheotomy was performed in sixteen cases. Twelve of these died, three were alive when last heard of, and in one case the result is unknown. From a study of these cases Felix concludes that the results from tracheotomy are most favourable when the operation is performed before the onset of dangerous dyspnœa, and in the early months of pregnancy. Regarding

thyrotomy, which was performed in one case (history after confinement unknown), Felix considers that it should only be resorted to when both disease and pregnancy are in the early stages.

There is considerable diversity of opinion as to whether the uterus should be prematurely emptied in the case of women suffering from laryngeal tubercle. The most prevalent view would seem to be that where the disease is in such an early stage that there is hope of cure the child should be sacrificed. Where the disease is advanced, the pregnancy should be allowed to go to term.

Felix concludes by urging the desirability of preventing women suffering from laryngeal tubercle from marrying, even though the disease be in an early stage. He also draws attention to the fact that where tubercle has been apparently cured it frequently recurs during pregnancy.

New Books and New Editions

A Short Practice of Medicine. By ROBERT A. FLEMING, M.A., M.D., F.R.C.P.E., F.R.S.E. Pp. xx. + 748. London: J. & A. Churchill. 1906. Price 10s. 6d. net.

THE author of this work has very satisfactorily fulfilled his intentions in writing it, as explained in his preface. It is essentially a handy, reliable, and readable guide for students going up for examinations. How is it possible, it may be asked, looking at the rapid strides we have been making in medicine of late years, how is it possible to embody all our knowledge in less than 800 pages? And the question may seem all the more justified when one looks at the excellent printing, the distinct paragraphing, and the headings marked by a larger and blacker type. The answer is that the very growth of medical knowledge makes it desirable that subjects formerly treated in a work on "Practice of Physic" should now be studied in separate books. Thus the various books on Clinical Methods, one of which every student should make his bosom companion during his final years, relieve the more general text-book of innumerable descriptive accounts and diagrams. Diseases of the skin are now rarely admitted. Dr Fleming has likewise found it impossible in the space at his disposal to write, as originally intended, an account of the medical anatomy and physiology of each system. It is to be noted that it is intended that *everything* in this book should be

mastered by the reader, and the time is looked forward to when such a text-book, giving the general outline of each individual disease, would allow the teacher to devote his attention to special points, clinical cases in illustration, and hints on treatment. This is an admirable method for conducting the author's own class; other students could not do better than have an interleaved copy of this book for such personal addenda as they might gather from lectures, ward work, dispensary work, or reading. Even the margins, which are liberal, if used after the manner of Coleridge, would hold many notes, "written in smallest crow-quill size." A careful perusal of many sections in the book convinces us of its general reliability, while special praise should be given to the portions dealing with the lesions of nerves, and, indeed, of the nervous system generally. Too much condensation in this part of medicine is, as Dr Fleming has seen, apt to lead to obscurity. Two sides of a triangle may really take the traveller sooner to his goal than the third side, if the latter has obstacles in its course. The diagrams are sufficiently numerous and are admirably clear, and the index is exhaustive. Not the student only, but the grey-headed practitioner might with great profit use this well-written manual.

The Schott Methods of the Treatment of Chronic Diseases of the Heart, with an Account of the Nauheim Baths and of the Therapeutic Exercises. By W. BEZLY THORNE, M.D., M.R.C.P. Fifth edition. Pp. 140. London: J. & A. Churchill. 1906. Price 5s. net.

THIS edition is practically a reprint of what has proved a useful little work; it contains numerous pulse-tracings and cardiac outlines, as well as a complete series of figure sketches by which the exact method of carrying out resisted exercises is made plain. A description is given of how to prepare baths similar to those of Nauheim and equally effective. On the whole, it would appear that the system of exercises is more generally useful, and these can be readily employed by any medical practitioner who will take the necessary time and trouble. A trained intelligent nurse will soon acquire the skill to apply the method under medical supervision. (For a paper illustrating the signal benefits to be got by this means, reference may be made to Dr R. A. Fleming's "Treatment of Advanced Cardiac Dilatation," *Scottish Medical and Surgical Journal*, 1905, i. p. 218. His cases were confined to bed, and were treated with massage followed in ten days by passive movements, and only

then by the modified resisted exercises.) Dr Thorne lays down cautions which should prevent mishaps, special care being requisite in lung conditions complicating the circulatory derangement, in aortic defect, in angina, and in some cerebral conditions. These and other indications show that the practice of such methods must not be indiscriminately applied. Besides cardiac cases, there are other conditions where some excellent results have been obtained, such as anæmia of various kinds, asthma, and conditions associated with habitual coldness of the extremities, amongst which Raynaud's disease may be taken as the extreme example.

This book is more clinical than deeply scientific; it is on that account all the more likely to be of use to the general practitioner; there are few who will not get valuable hints from its perusal.

Aneurysm of the Abdominal Aorta. By F. P. NUNNELEY, D.M., M.A., Brasenose College. Pp. 121. London: Baillière, Tindall & Cox. 1906.

THIS is a thesis for the Oxford M.D., and besides a résumé of previous work, gives a series of 32 cases collected from the records of St George's Hospital between 1841 and 1905. The monograph is a piece of careful analytic work.

A Treatise on Diagnostic Methods of Examination. By Prof. Dr HERMAN SAHLI. Edited, with additions, by FRANCIS P. KINNICUTT, M.D., and NATHANIEL BOWDITCH POTTER, M.D. Authorised Translation from the Fourth Revised and Enlarged German Edition. Pp. 1008. Philadelphia and London: W. B. Saunders & Company. 1906.

SAHLI'S "Untersuchungs-Methoden" occupies a unique position amongst works on physical diagnosis. There is no work in which, in the different branches of clinical medicine, the diagnostic methods are so exhaustively discussed, and no work in which the clinical phenomena are so fully considered from the physiological and pathological standpoint. The work is elaborate, and as a book of reference for the physician and student is invaluable. The distinguished Swiss professor claims with justice that on every subject on which he has written the views expressed are based on his own experience, and that many of the theories advanced in explanation are his own. He does not believe in

hack-writing in medicine, and of making the journals and periodicals the sole depositories of new facts in clinical medicine. In his text-book there is to be found evidence of original work and original thought, with at the same time a very full and generous recognition of other workers.

The translation has been published much as it came from the pen of the author, but it has been enriched by many excellent photographs from the New York City Hospital and from the Massachusetts General Hospital, and by editorial additions giving the views and work of English and American observers.

To enter into a detailed criticism of the text of such a book would be, to say the least, undesirable. It stands alone as the most complete account of clinical methods which we at present possess. The original value of the volume has been enhanced by the work of the translators.

Catarrhal Fevers, commonly called Colds: their Causes, Consequences, Control, and Cure. By R. PROSSER WHITE, M.D. Ed., M.R.C.S. Eng. Pp. 111. With illustrations. London: H. K. Lewis. 1906. Price 4s.

IN our large centres of population the sum total of discomfort, of suffering, and even of serious disease in the debilitated and the aged, which are produced by what is popularly called "a cold," is very great. It may be thought Utopian to endeavour to stamp out this disease, but when we consider what has been done in this country in relation to smallpox, typhus, and typhoid fevers, a very marked diminution in the frequency of this infectious disease does not seem to be unattainable. Some medical men have been endeavouring to teach the laity that "colds" are infectious, and should be dealt with accordingly; but a new crusade is needed, and Dr Prosser White's small volume is welcomed as a valuable educative agency. It deserves to be widely studied. The part on bacteriology records the investigations of other workers as well as the author's original research; it is readable and concise.

Under differential diagnosis of catarrhal fever from influenza the author states that as in recent epidemics of influenza catarrhal symptoms have been almost a negligible quantity, their absence would point to influenza; while this is true, their presence would not enable us to exclude influenza.

The dictum that, "amongst the best drugs for this disease (catarrhal fever) in its early stages are phenacetin and alcohol" will not meet with universal approval, even by those who are not total abstainers.

Clinical Studies in the Treatment of the Nutritional Disorders of Infancy. By RALPH VINCENT, M.D., M.R.C.P. Pp. viii. + 84. London: Baillière, Tindall & Cox. 1906. Price 3s. 6d. net.

THIS little work consists of the records of twenty cases of malnutrition in infants, which were treated in a hospital in Hampstead, to which the author is physician. It is intended as a sort of practical supplement to his former book on "The Nutrition of the Infant," and is published to illustrate the principles before laid down.

The case-records detail the child's age, sex, and weight, and give a short résumé of his clinical history. The treatment in hospital, which consisted in somewhat elaborate and frequently varied modification of the milk, is then described. Lastly, the progress is noted in the form of a statement of the variations in the child's weight and in the character of his stools. The cases recorded illustrate the advantages possessed by a physician who has a "milk laboratory" at command, and they cannot fail to interest those who have appreciated Dr Vincent's larger work. In studying them, however, the reader is tempted sometimes to wonder whether a similar success might not have been obtained by the persevering use of simpler mixtures, such as any mother might have made for herself at home.

Notes on Local Anæsthesia in General Surgery. By J. W STRUTHERS, M.B., F.R.C.S.Ed. Edinburgh: William Green & Sons.

SHOULD this small volume be of no further use than that of drawing attention to the fact that many operations now performed under a general anæsthetic, can, without pain to the patient, be performed under local anæsthesia, it will not have been written in vain. It, however, will do more than this, and should be in the hands of all those who are in the habit of performing minor surgical operations. The book is well planned, carefully written, and easily read. The first chapter deals with the various drugs commonly used for local anæsthesia. The author maintains that cocaine, notwithstanding the various new local anæsthetics that have recently been introduced, is, properly used, the most useful drug for inducing local anæsthesia. The second and third chapters deal with infiltration anæsthesia. The method described by Schleich is fully detailed: but the author holds that Braun's view regarding isotonic solutions is probably the more correct. Lennander's interesting work on the sensibility of the abdominal organs is

touched upon. Many operations are described which may with advantage be performed under a local anæsthetic, for which the great majority of surgeons in this country would, at the present day, give a general anæsthetic. The next chapter deals with regional anæsthesia, and in it the work of Crile and Braun are mentioned. The importance of combining the anæsthetic with some preparation of adrenalin is emphasised. This is the most interesting chapter in the book. Sufficient details are given to show the possibilities of this fascinating method. In addition to the above there is a short chapter on spinal anæsthesia, the technique described being that which is used in Professor Bier's clinique. The author is to be congratulated on the careful way in which the work has been prepared, and also that so much interesting information has been detailed in a book of such small size.

Heath's Manual of Minor Surgery and Bandaging. Thirteenth edition. Revised by BILTON POLLARD, F.R.C.S., Surgeon to University College Hospital, etc., etc. London: J. & A. Churchill, 7 Great Marlborough Street. 1906.

A WORK so well known as "Heath's Minor Surgery and Bandaging" requires no introduction from us: its reputation has been long established. Under the able revision of Mr Bilton Pollard the thirteenth edition has now been published, and, by judicious additions and alterations, brought up to date. The advance of asepsis has led to considerable changes in the first chapter, which deals with the sterilisation of dressings, catgut, etc., and gives a practical account of the conduct of an aseptic operation. Most hospitals, at any rate the larger ones, are, however, furnished with more suitable apparatus than that illustrated in fig. 2. Luy's urine segregator and other modern instruments have been inserted, while the chapter on Anæsthetics receives careful attention at the hands of Mr Dudley Buxton.

The original character of the book is still the same: the kindly counsel of the late author still remains to guide the present house-surgeon, as it has guided so many in the past.

Hints on the Management of the Common Infections. By R. W. MARSDEN, M.D., M.R.C.P., D.P.H. Pp. 128. London: William Heinemann. 1906. Price 3s. 6d. net.

THIS small volume presents in a clear, concise, and readable form practical details, based on scientific considerations, as to prophylaxis and treatment of the infections, and intoxications due to micro-organisms, which are common in this country.

The paragraphs on the care of mouth, throat, nose, ear, and

eye might with advantage have been placed in Chapter I.—General Measures—rather than under Measles.

The book is well worthy of careful perusal, the appendices not less than the rest of the work.

Nursing at Home. By J. D. E. MORTIMER, M.B. (Lond.), F.R.C.S. (Eng.); and R. J. COLLIE, M.D. (Aberdeen). Pp. vi. + 128. London: Geo. Gill & Sons, Ltd. 1906. Price 8d.

WE have pleasure in drawing attention to this excellent little book, which is evidently the result of wide experience in the matters it discusses, and in the best ways of presenting them to non-medical readers. It deals very plainly and sensibly with the most important matters regarding nursing, including digestion, food, and feeding, with infectious diseases and disinfection, and with the care of infants and older children in health and disease. There is also a chapter on bandaging, and an appendix, with recipes of various foods and drinks, and information about children's dress.

The style is plain and concise, though quite explicit, and the illustrations are also good and to the point. No previous knowledge of the subject on the reader's part is required.

We have seldom seen a less pretentious work, or one more admirably fitted for its purpose.

The Care of Children. By ROBERT J. BLACKHAM, D.P.H. (Lond.). Pp. xii. + 84. Revised and enlarged edition. London: The Scientific Press, Ltd. 1906. Price 1s. 6d. net.

CAPTAIN BLACKHAM deals shortly with the usual details regarding the child's food, clothing, hygiene, and ailments, which all mothers and nurses should know something about. A large amount of useful information is given, though many of the statements made would have been the better of some qualification and further definition. In describing the infectious diseases, the author quotes from the "Code of Rules of the Medical Officers of Schools Association." His information, however, is not at all in close accord with that in the recent editions of that excellent work. His suggestion that the kindergarten is the cause of the prevalence of short-sight in Germany is amusing. It is not likely to inspire confidence in his opinion on other matters of school hygiene.

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THE SCOTTISH
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THE USE OF BLOOD EXAMINATION IN GENERAL PRACTICE[1]

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My purpose to-day is to show you, as far as can be done in so short a time, in what way the examination of the blood can be made of use in general practice, and to show you also, that the methods at present used are largely capable of being applied by general practitioners. The principal requisites are a certain neat-handedness, a certain knowledge of histology, and a certain amount of patience, perseverance, and enthusiasm.

While there are a great many methods in use for examining the blood, those which are of value clinically are the following:—

1. The estimation of hæmoglobin.
2. The enumeration of red corpuscles.
3. The enumeration of white corpuscles.
4. The examination of stained films.
5. The glycogen reaction.

Of the other methods in use, some, such as the examination of wet films, are largely superseded by more exact methods, and others, such as the bacteriology of the blood, the estimation of the opsonic index, and of the coagulability of the blood, are either cumbrous or else require resources of the laboratory which one cannot always command in general practice.

In discussing the methods which I have described as useful, I propose first to say a few words about the method itself and then

[1] An Address delivered to the Glasgow Southern Medical Society, and to the Scottish Division of the Border Counties Branch of the British Medical Association.

to illustrate its usefulness by cases which have occurred in my experience.

1. *Estimation of Hæmoglobin.*—The instrument which is most useful to the general practitioner, because it is most easily applied, is the hæmoglobinometer of Tallqvist. It consists of a little book in which are bound a number of pieces of white filter-paper, while at the end there is a scale of colours corresponding to percentage dilutions of blood and numbered from 10 to 100. The finger or ear is pricked, a large drop of blood allowed to soak into a piece of filter-paper, and as soon as that has lost its damp gloss, the colour is compared with the scale by running the paper underneath the apertures in the sheet of colours. This must be done in good daylight, and care must be taken to look squarely at the colour sheet so that the gloss of the printed colours does not strike the eye. With a little practice it is easy, not only to say whether blood has, say, 80 or 90 per cent. of hæmoglobin, but also to estimate whether it is nearer the 80 or 90 per cent., and thus the nominal error of 10 per cent. can be considerably diminished. I have very often controlled this apparatus by more exact methods and find that its readings are very accurate. I should never dream of using it in very important cases, but for the needs of general practice it is amply sufficient—if anything, it tends to read rather too high.

If something more accurate is wanted, Haldane's modification of Gowers' hæmoglobinometer is the most satisfactory, as it is both portable and exact. It has, however, the disadvantage that it is necessary to saturate the diluted blood with coal gas in order that this may be comparable with the CO.—hæmoglobin of the standard supplied. The Tallqvist instrument is valuable in the first place for diagnosing whether a patient is really anæmic or not. I saw a lady some time ago who had been treated by numerous physicians for anæmia. She was very pale and had suffered from breathlessness and so on, and had swallowed I don't know how much iron. Her hæmoglobin was 95 per cent., her reds 4,830,000, and her pallor was due in reality partly to a poor circulation and partly to a thick skin. It is very difficult for us to rid ourselves of the idea that pallor of the skin means anæmia, and redness of the skin the reverse. I had a case recently under observation of a man whose hæmoglobin never rose above 50 per cent. and whose face and, to a less extent, his mucous membranes, looked quite red and normal. You will all be able to recollect similar instances.

In the second place this instrument is useful for cases of chlorosis. This is a disease which it is fairly easy to diagnose without blood examination, provided one can with certainty exclude such causes of chlorotic anæmia as tubercle and concealed bleeding—at least I judge that these cases are easy to diagnose because one hardly ever sees them in consultation. But it is not so easy to know without estimating hæmoglobin what the exact degree of anæmia really is, and whether the patient should be kept in bed or allowed to go about. My own rule is to insist that a patient with a lower hæmoglobin percentage than 60 must stay in bed for whatever time is necessary. The routine estimation of hæmoglobin will also enable one to tell whether iron should be discontinued or whether it should be gone on with.

Again, a very important indication for hæmoglobin estimation is in order that one may make out the colour index; that is to say, whether the average corpuscle is carrying its proper amount of hæmoglobin or not, because this is a most important factor in the diagnosis of the different forms of anæmia.

2. *Enumeration of Reds.*—For this there is no instrument so satisfactory as Thoma's, which is made by all the principal instrument-makers, and no other method yet proposed can anything like equal it in accuracy. The diluting fluid for the red corpuscles should be Hayem's, which is made up as follows: —

Hydrarg. perchlor. . . .	.5 grm.
Sod. chlorid.	1 ,,
Sod. sulphat.	5 ,,
Aq. dest.	200 c.c.

I do not advise the use of Toison's fluid or any other where stains are added. It is not advisable to attempt to count reds and whites in one preparation.

I need not detail the method of counting—that is given in every clinical manual, and everything depends in it on rapidity, neatness, and cleanliness of the pipette and counting-slide. One point worth bearing in mind is that it is not necessary to count the corpuscles at the bedside, but that a rubber strap can be put round the ends of the pipette and it can then be taken home, held approximately horizontal, and the contents counted at leisure. One hundred small squares should be counted in every case.

3. *Enumeration of White Corpuscles.*—Here, again, none of the numerous methods which have been proposed is so good as Thoma's

method. The diluting fluid should be a 1 per cent. watery solution of acetic acid coloured a light green with methyl-green, and the whole central ruled space of the counting-chamber should be gone over. It is always wise to use a dilution of 1 in 10 in an unknown case; that is to say, the blood should be drawn up to the mark 1. None of the other methods advocated give an accuracy which is proportionate to the trouble involved in them. The whites are much easier to count than the reds, and it will be found in practice that it is more often necessary to count them than the red corpuscles.

The normal number in the c.mm. is usually given as from 7000 to 10,000, but I find that many perfectly healthy people have a lower count and that as a rule 10,000, except when digestion is going on, means some abnormality, possibly, of course, only a slight one.

4. *The Examination of Stained Films.*—An almost countless number of methods have from time to time been advocated for fixing and staining films, but the one which will be found most useful in general practice is undoubtedly the combined method of fixing and staining devised by Louis Jenner. Its principal advantages are that it takes a very short time, as the fixing and staining solutions are combined, and that it shows everything that in ordinary practice one is in the least likely to want to see. In my experience it is superior in this last respect to any modifications of it which have been proposed—such as Wright's, Leishman's, and other stains. In a considerable number of cases in practice, nothing more is required for diagnosis than examination of stained films—such, for instance, as leukæmia, malaria, severe pernicious anæmias, and severe secondary anæmias. Of course the first necessity is good film preparations, and for these the real essential is clean cover-glasses. If the cover-glasses used are clean, almost anyone can make good films: if they are not clean, no one can do so. Many ways of cleaning cover-glasses have been advocated, but the simplest methods are really the best. My own practice is to pour half an inch of nitric acid into a tall urine-glass and then drop the covers to be cleaned into this one by one. Shake them up and leave them for a few minutes; then pour off the nitric acid. The covers ought then to be washed in several changes of water—more in proportion as there are more cover-glasses; then taken out, drained on blotting-paper or a clean towel, and preserved until wanted in absolute alcohol in a stoppered bottle. They should never be taken out and

dried until just before they are going to be used, as they very soon gather dust and other impurities.

I do not find that I can get such even films with slides, and these have the disadvantage that they are less easy to stain and require larger and therefore more expensive cover-glasses. Nothing is really gained by using cover-glasses which are too thin. For years past I have always used ⅞ circles No. 2, and if one takes care to reject any exceptionally thick cover which has found its way in among them, these are amply sufficient. No. 1's break too easily, and while one can make sure of getting thinner films by them, it is by no means always an advantage to do so. The films from which one learns most are usually thin at one part and thick at another, for it is in these that it is most easy to estimate the shape of red corpuscles and to make a differential count of whites.

Jenner's stain can be bought from any chemist, or the soloids of the dry powder made by Burroughs & Wellcome give an excellent result. The soloids should be dissolved in methyl alcohol (Merck's pure for analysis), as many other alcohols of the kind contain acetone, which spoils the stain hopelessly.

The procedure to be followed is to catch the cover-glass in a pair of Cornet's forceps, lay this on a table with the film side up and drop about eight drops of the stain on it. Allow the stain to remain there for from half to one and a half minutes according to the result desired, wash rapidly in distilled water, tilt the forceps so that the edge of the cover rests on a piece of blotting-paper, and leave it to dry in the air. When dry, mount it in balsam in xylol. The whole procedure should not take more than five minutes.

The reason for the variation in time given above is that if one wishes the methylene blue of the stain to predominate, one should stain for a shorter time; if the eosin, the longer time: of course no two samples of the stain will give exactly the same results; one has always to find out by a little experiment just how long to give. In most cases a half to one minute is ample time, and most of the bad results that one sometimes sees ascribed to Jenner's stain are due to leaving it on the film probably three to five minutes, as one sees prescribed in text-books.

I need not describe the look of the cells with the stain, as you will see that amply illustrated in the demonstrations given. I find that Leishman's stain is probably more generally used at present than Jenner's, but this is a mistake, for Leishman's stain does not

bring out the granules of the leucocytes nearly so satisfactorily. It is indispensable if one wants to study such parasites as malarial plasmodia, trypanosomes, etc., minutely, but for general purposes it should be avoided. Ehrlich's Triacid stain may be used when myelocytes are to be sought for and for some other purposes, but for general practice Jenner's is ample.

One of the principal reasons for staining films, in addition to the information which is got about the red corpuscles is in order to be able to make a differential count of the different varieties of leucocytes present. Normally the proportions are as follows:—

Lymphocytes of all kinds	from 25 to 30	per cent.
Polymorphs	from 60 to 75	,,
Eosinophils	from 1 to 4	,,

Here and there in most bloods an occasional basophil will be found. These proportions, of course, vary immensely in different cases as I shall illustrate to you later. You will find in many text-books that no differential count is supposed to be worth anything which is not based on a count of 500 cells. For absolute accuracy this is quite true, but if one chooses a reasonably well-spread area in the centre of the films, one can very well get all the information one wants by the count of 100 or, at the outside, 200 cells. I have often, in teaching my Blood Class, set a class to count 50 cells each, and have been frequently surprised to see how closely the successive 50's tallied with one another.

5. *Glycogen Reaction.*—This is carried out by placing a rather large drop of the following iodine solution on a slide, dropping the film upon it, allowing it to remain for about half a minute, and then pulling the cover-glass to one side so as to examine it through as thin a layer of the fluid as possible. The fluid is made up as follows:—

Iodine	1 grm.
Iodide of potash . . .	3 grm.
Distilled water . .	100 c.c.

with enough gum acacia to make a syrupy solution, about 50 grms.

The film must be examined with white light—either daylight, the light from an incandescent gas burner, or from a Nernst electric lamp, because of course the yellowish red tint of the glycogen does not come out well with ordinary yellow light; and an oil immersion objective must be used.

The reaction when it is present is confined to the polymorphs.

It does not appear in the other leucocytes, and may occur in three grades. The first is as a very fine stain or stippling of yellowish brown or red throughout the body of the cell. In the second grade the granules are larger, and in the third the granules may be very large, are usually confined to the periphery of the cell and may project beyond it. These three grades correspond pretty closely to the intensity of the condition causing the reaction. A considerable number of cells should always be examined before a negative is regarded as proof. It must be remembered also that granules of glycogen are found normally among the masses of blood plates in the film, and these are always to be disregarded.

Next to the examination of the stained film, this is the most useful method for the practitioner. Whenever it is present it means that the patient is *ill*, and also that he is suffering from a toxæmia of some kind. What that toxæmia is will usually be indicated more or less by the symptoms and signs of the case. It is present most markedly in infections by the pneumococcus, streptococcus, staphylococcus, and the bacillus colus; other organisms of course may cause it, and it appears also with some metabolic and other poisons, such as uræmia and morphine poisoning. The more marked the reaction, the more acutely is the patient being poisoned. Its great disadvantage from the point of view of the practitioner is that it requires the use of an immersion lens, and also that it requires a little practice to interpret it; but the advantages to be gained from its use are so numerous that this should not be allowed to stand in our way.

In discussing the results to be obtained by these methods, one must distinguish between cases of anæmia and cases of general disease. In the former, blood examinations ought invariably to be employed, and are, of course, essential to a proper understanding of the process which is going on. In the latter, they ought to be regarded as one method of helping oneself in doubtful cases, and are, to a certain extent, on a par with such examinations as those of the sputum, stomach contents, and so on.

Anæmias.

Chlorosis.—In these cases, estimations of Hb. at regular intervals are often sufficient for guidance in treatment. This much is quite easy and it should never be neglected. The fact that it is done so little is largely responsible for the recurrences of chlorosis

which occur, for these patients are so accustomed to a low standard of Hb., say about 50 per cent., that when they get up to 70 per cent. they feel and look much better and are apt to be contented with that result. Were they treated and watched until the Hb. reached the normal, they would be much less apt to drop back again. In very severe cases, however, it is necessary to make a red count, for the reds sometimes, in chlorosis, drop down to 3,000,000, or even less, and these cases demand very careful and prolonged treatment. The essential point in diagnosis of this form of anæmia is the presence of a low colour index. By this is meant that each corpuscle in the blood on an average is carrying a smaller amount of Hb. than it should, and actually one finds that the red corpuscles in chlorosis are small, pale, and of light weight. The colour index can be arrived at by multiplying the first two figures of a red count by 2, in order to get the percentage of red corpuscles in relation to the normal, and then dividing the Hb. percentage by the figure so obtained. Thus, a blood containing 4,500,000 reds with a Hb. percentage of 90 will give a colour index of exactly 1; while a blood with 4,500,000 reds, and an Hb. percentage of 50, which is a very common combination in mild chlorosis, will give a colour index of .55. The reason why the treatment of chlorosis must of necessity be prolonged is that it takes some time for the small pale corpuscles, which such a colour index involves, to be broken down and disappear from the circulation, and for full-sized normal ones to take their place.

Pernicious Anæmia.—This is an extremely important disease, and very much more common than is usually supposed. During the past year I have seen about 30 new cases, and of these certainly not half had been diagnosed or even suspected before I saw them. The others were labelled with such titles as Neurasthenia, Early Phthisis, Gastric Catarrh, Peripheral Neuritis, and Locomotor Ataxia (in cases where the nerve symptoms were marked), Septicæmia, Gastric Cancer, Heart Disease, and so on. The cases which become rapidly anæmic are usually diagnosed correctly. It is the chronic cases, which are more common than the acute ones, which are more likely to be missed. I have seen plenty of cases of a ruddy countenance whose blood showed the characteristics of pernicious anæmia. For example, a young man with a Hb. percentage of 80 and a red count of only 2,500,000, and an old gentleman with a Hb. percentage of 75 and a red count of 2,800,000. I cite these two cases because, though neither of them looked pale, their blood happened to show

the most characteristic changes. The essential point in the diagnosis of this disease is a high colour index. If one takes the first of the two counts named, it will be seen that the colour index calculated as above reached the very unusually high figure of 1.6. Most pernicious anæmias vary between 1.1 and 1.3, and as a general rule a glance at a stained film should enable one at least to suspect pernicious anæmia, for so many of the reds are large plump cells, quite different from the small pale ones of chlorosis and secondary anæmia. Of course, if one finds the large nucleated reds which are known as megaloblasts, and which are the precursors of this large red corpuscle, the diagnosis may be made without further ado. The reason for insisting on an early diagnosis of these cases is that nearly all the acute cases which one sees are really only the terminal stage of a long-standing chronic condition, and I have repeatedly satisfied myself that this acute terminal stage, though it cannot always be ultimately prevented, can at least be staved off by appropriate treatment.

Secondary Anæmias.—These arise in such conditions as malignant disease, especially where it is accompanied by hæmorrhage, as, for instance, in some gastric cancers; in such hæmorrhagic conditions as hæmorrhoids, gastric ulcers, epistaxis, menorrhagia; in septic anæmias such as those after confinement; in ulcerative endocarditis and other conditions where organisms are present in the blood, and in many other states. All of these anæmias have more or less the chlorotic character, that is, they have a low colour index. It is important to bear this in mind, because they often simulate pernicious anæmia in cases, for instance, where there is no very obvious source of bleeding, or where, when the condition is malignant, there is no palpable tumour. I have repeatedly found myself unable to judge from the clinical history and signs and symptoms alone as to the character of some of these anæmic conditions, so I have laid down the rule for myself never to give an opinion on any case of anæmia until I have made a full blood examination.

In all these conditions the red corpuscles are principally at fault, though the occurrence of leucocytosis in many secondary anæmias helps one considerably.

Spleno-medullary Leukæmia or Myelæmia.—This is always apt to be suspected by the practitioner because of its chronic character and because the spleen and often the glands are usually enlarged before the patient comes under observation. In most ordinary cases of

this disease a stained film is quite enough to make the diagnosis, as the leucocytes are usually so enormously increased in number that the change is obvious even to an untrained observer. The diagnosis depends on the presence of cells in the blood which are normally only found in the marrow. Whenever the spleen is found to be enlarged, a film should be at once examined, because it is most important to exclude other causes of splenic enlargement such as malaria, pseudo-leukæmia, Banti's disease, etc. I remember one case where an enormously enlarged spleen was sent to a surgeon as a cellulitis of the left side of the abdominal wall, was referred by the surgeon to a gynecologist as a pelvic tumour, and then to me because the gynecologist didn't know what to make of it.

Lymphatic Leukæmia or Lymphæmia.—Of this disease there are two forms: the chronic, which is clinically exactly like splenic leukæmia, except for the fact that the cells present in excess in the blood are lymphocytes, and not medullary cells; and the acute form, which is clinically entirely different from the other, and is very apt indeed to be missed. Dr Goodall and I recently published a pathological study of ten cases, of which four at least went undiagnosed to the post-mortem room, and I have seen others which were put down to endocarditis, typhoid, scurvy, osteomyelitis, etc. The reason for this difficulty is that the more acute the case, the less likely are the spleen and glands to be enlarged. The disease is clinically a rapidly advancing anæmia, often with high temperature, with hæmorrhage, bone pains, etc., and sometimes the development of a regular typhoid state, and many of these cases die undiagnosed. The diagnosis here depends on an absolute increase of the number of leucocytes, though in acute cases these may not reach a very high figure, and in particular on a greatly increased percentage of the lymphocytes present, usually over 90 per cent.

General Diseases.

The special point to be borne in mind here is that the blood examination is to be undertaken with the fullest possible previous knowledge of the patient's condition and an appreciation of the problem involved, and of the conditions between which diagnosis lies. This is the rule, though there are occasional exceptions. I shall cite an exception first. Some years ago I met a doctor who had been invalided home from the East with a slight intermittent fever which was diagnosed as malaria. He had been seen by several

tropical specialists in London who had confirmed the diagnosis, but without examining his blood. He came to Edinburgh and took out my Blood Class. One day we were examining each other's blood with a view to differential count, and I found that he had a lymphocyte percentage of 70 with a normal total count. This was so suggestive of tubercle that I asked him to let me examine his lungs, and I there found the cause of the fever in an early apical condition. This was treated with complete recovery. In most cases, however, the blood has to be examined in order to get some definite information which is lacking from the other signs and symptoms, and usually that is to be got from the leucocytes, either from an increase, decrease, or a normal total count, or from change in their relative proportions, or from the presence or absence of the glycogen reaction. The ways in which these may be used are almost infinite, and I can only illustrate a few of them.

Some time ago I saw a young gentleman who was supposed to be suffering from phthisis and who had, in addition, constant rigors with high temperature which were supposed to be due to malaria. He had been abroad, and might conceivably have contracted malaria, and the plasmodium was supposed to have been found. I saw him just after one of his rigors, could find no evidence of malaria, but made out that he had a distinct leucocytosis with a marked glycogen reaction. I repeated this observation several times, and examined his sputum frequently for tubercle bacilli, but always unsuccessfully. I then came to the conclusion that he was really suffering from an abscess of the lung, and that these rises of temperature were due to occasional damming up of pus. The subsequent course of the case fully justified this opinion. One finds, indeed, that many cases are put down to malaria, without blood examination, in which some concealed suppuration is the cause of the rigors. I recollect, for instance, cases of ball-valve gall-stone, prostatic abscess, and numerous cases of pyonephrosis, associated with rigors, and diagnosed as malaria, where a complete examination made it certain that one was not dealing with malaria, and turned attention in the right direction.

Pneumonia.—This is a typical example of a leucocytosis producing disease. The increase of leucocytes is almost entirely in the polymorphs, and the glycogen reaction is so constant that one can definitely use it as a diagnostic. There are two sets of cases, however, in pneumonia in which there is no leucocytosis: very slight cases, in which the glycogen reaction is also very slight, and which always

get better, and very severe cases in which the poisoning is so intense that resistance is overwhelmed and leucocytosis does not occur. In these the glycogen reaction is well marked and the patients always die. The great majority of cases, however, show leucocytosis. You all know the close resemblance that there sometimes is between pneumonia and typhoid. In such cases the finding of leucocytosis would always determine the diagnosis in favour of pneumonia, for uncomplicated typhoid not only has no leucocytosis, but usually a diminution in the total number of leucocytes and a relative increase of lymphocytes. Again, the blood can be used as a diagnostic between two leucocytosis-producing diseases. I remember an interesting case which I saw some years ago. Two children in one family took scarlet fever in a rather severe form. On the second day after being with them, an older boy of the same family was taken acutely ill with a high temperature, but no sore throat or rash appeared. The doctor suspected pneumonia, but could find no evidence of it, and thought that it might be scarlet fever with a delayed rash. I could find very little in the chest beyond a slight diminution of the expansion on the one side, but the blood-count showed a leucocytosis of 38,000 with a marked glycogen reaction. This was a much higher count than is usual in scarlet fever, and the glycogen does not appear in that disease unless there is a secondary suppurative change. We therefore gave a diagnosis of pneumonia, which turned out to be correct. The blood examination is, therefore, as you will see, of great value in cases of pneumonia which begin deep in the lung.

Typhoid Fever.—In this disease, as I have already said, there is a diminution of leucocytes, and this change is of great value in diagnosis, because it appears much earlier than Widal's reaction and is more constant. It is all the more valuable because most gastro-intestinal catarrhs have a leucocytosis, with the exception of the para-colon infections, which are rare in this country and are practically indistinguishable from typhoid.

Appendicitis and Abdominal Suppuration.—In no disease has blood-counting been more used than in appendicitis, but unfortunately too often without a proper understanding of what the results of examination mean. The blood examination *must* be used here with the fullest knowledge of the onset, course, and local conditions, because the organism which is doing the mischief is usually either the coli bacillus or one of its congeners, none of which cause so great

a leucocytosis as the pneumococcus or the ordinary pus-producers. A slight catarrhal case where the inflammation is confined to the interior of the appendix will cause only the slight leucocytosis which any intestinal catarrh shows, say, 10,000 to 12,000, with no great increase of polymorphs and no glycogen reaction. But the moment the inflammation spreads to the surface of the appendix, the peritoneum becomes irritated and this results in an increased leucocytosis, an increased proportion of polymorphs, and the presence of a glycogen reaction. These become more marked the more severe the irritation, and the presence of gangrene or pus causes a further increase. The only exception is in the foudroyant cases where the poisoning is intense and where, as in very severe pneumonia, there may be no leucocytosis and no increase of polymorphs, *but* there will be an intense glycogen reaction. These cases are rare, however, and usually start so acutely that there is little doubt about their nature. The rule which is usually formulated with regard to the other cases is that a leucocytosis of 20,000 or 25,000 means immediate operation. Below that number, the guide should be the severity of the case; and where the leucocytosis is only moderate, the severity of the glycogen reaction is a safer guide than the actual leucocyte count. Of course I am speaking here only of cases where the blood examination needs to be called into play from the doubtfulness of other signs and symptoms. To other suppurations the same rules apply, and it may, in given cases, be of great importance to distinguish an acute suppuration from a tubercular one, for remember that in uncomplicated tubercle there never is a leucocytosis except in the one case of tubercular meningitis. Here again, however, it must be borne in mind that a chronic abscess if it is well walled off will show little or no leucocytosis or glycogen reaction, but will almost always show a percentage of polymorphs in excess of that shown by a tubercular suppuration.

Fever in the Puerperium.—I have often seen men in doubt as to whether rises of temperature in their patients after confinement were due to influenza or to a septic condition. A blood examination would settle the matter at once, for uncomplicated influenza shows no leucocytosis and no glycogen reaction, while practically all the septic conditions which occur in the puerperium give rise to an increase of leucocytes and a glycogen reaction.

I might go on to describe the value of an increased percentage in the eosinophils in the diagnosis of skin diseases, of asthma,

intestinal parasites, and so on, but I fear I have already trespassed too far on your kindness. I hope, however, I have at least shown that there is something to be learned by blood examination, and that it is quite within the power of the general practitioner to help himself by it.

THE THYROID GLAND IN RELATION TO MARASMUS

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As very little has been written on the condition of the thyroid gland in children, I began some time ago to make some investigations in that subject at the Sick Children's Hospital.

During the last two or three years, I have examined the thyroid gland in a large number of cases on which a post-mortem examination had been held, in order to ascertain what changes, if any, are to be found in this gland amongst children dying from various diseases.

Normal Thyroid of a Child.—The normal thyroid of a child differs very slightly from the normal thyroid of the adult. In both we find the gland invested by a firm fibrous capsule, which sends in septa partially dividing it into lobules of various sizes, while still finer divisions of this connective tissue framework surround the individual follicles, and give support to the minute ramifications of blood-vessels, lymphatics, and nerves. In the child, however, the connective tissue of the gland is found to be somewhat more strongly developed, whilst the follicles, lined by cubical epithelium and filled with colloid, are more irregular in size and shape than are those of the adult.

A few words must here suffice to describe the development and chemistry of the thyroid so far as they are known to us.

The gland is developed primarily as an outgrowth of the pharyngeal hypoblast, and in some lower animals this connection with the pharynx is still maintained. In amphioxus, for example, the thyroid is represented by a hypobronchial organ, which pours the secretion directly into the pharynx; whilst in some higher forms of life, such as in fishes, the gland is embedded in the surrounding tissues, but the duct which communicates with the pharynx still

remains. The developmental history therefore clearly shows that the thyroid as we now find it in man has been evolved from a secretory gland, which originally was provided with a duct, through which its secretion passed into the pharynx. We naturally infer, therefore, that, originally at least, the thyroid secretion played some part in the digestion of food. This would also help us to understand the fact that the activity of the thyroid secretion is not destroyed by passage through the stomach, but can still produce all its usual physiological effects when swallowed and absorbed from the alimentary canal, so that, as experience now proves, feeding by the gland itself acts as efficiently as injecting its extract.

Something must now be said in regard to the colloid substance.

This colloid substance is the secretion of the epithelial cells which line the alveoli, and, as the thyroid is a ductless gland, the secretion can only escape by the lymphatics or veins. The evidence which we possess indicates the lymphatics as the usual path.

As to its composition, much careful research work has been done by physiological chemists, but so far our knowledge of this secretion is by no means complete, though several important constituents have now been separated out from it. It was early proved that the gland contained considerable quantities of extractives, viz. Xanthin, Hypoxanthin, Kreatin, etc., indicating high metabolic activity, but none of those could be looked on as the active principle. In 1896, Baumann of Freiburg isolated from the thyroid gland of man, and of many animals, a body containing Iodine in organic combination, and which possessed the physiological characteristics of the gland. He further showed that this body was as active as the thyroid extract itself, and from this he concluded that "Thyroidin," as he named this substance, was the active principle of the gland. Oswald, who substantiated these views, also says that the colloid material is a mixture of Thyro-globulin and Nucleo-proteid. The Thyroglobulin, which forms the greater part of the colloid, combines with the Iodine to form an Iodin-albuminous substance, and from this substance can be separated out the so-called active principle "Thyroidin." Baldoni found that in some goitrous glands there was a Thyroglobulin which did not contain Iodine, and this Thyroglobulin containing no Iodine was proved to be physiologically inert. This shows that the physiological activity of the Thyroglobulin depends on its containing Iodine in the molecule. I would specially draw your attention to this fact, as I shall point out afterwards,

in discussing the gland in marasmic children, that this colloid material containing Iodine seems to be very important.

I have now collected and examined 80 different thyroid glands taken from children who have died of various diseases, and these I have classified under the following groups :—

Thyroids of children dying of :—

I. Acute Diseases (Broncho-Pneumonia, Endocarditis, etc.).

II. Tuberculous Diseases.

III. Marasmus.

Before, however, recording the results observed, let me very shortly point out the appearance of the thyroid as seen in premature children. In 4½ months old fœtuses, colloid material may be observed in the vesicles, whilst in premature children of 8 months, the gland may appear practically normal ; nevertheless, in all premature, and indeed in all newly-born children, there seems to be to some extent a certain deficiency in the amount of the colloid substance. It may be mentioned, however, that the appearance of the gland will, as we shall afterwards notice, vary according to the cause of the prematurity. And now to return to the results obtained under the above mentioned classification.

GROUP I. *Acute Diseases.*—There were in a large number of cases well-marked changes to be seen, ranging from a condition in which little departure could be observed from the normal, down to an almost total destruction of the follicle, which left the gland scarcely recognisable. Moreover, most of those sections which showed a marked departure from the normal showed also a great similarity in their changes, the most noticeable features being :—

(*a*) Marked diminution of the colloid.

(*b*) Vesicles without colloid frequently filled with infiltrating cells.

(*c*) Increase in fibrous tissue.

GROUP II. *Tuberculous Diseases.*—The changes seen in the thyroid were much the same as those already observed under the group " Acute Diseases," though, in passing, I may mention that in this group departure from the normal took the form of " increase in fibrous tissue " more frequently than those other forms of changes specified under (*a*) and (*b*).

GROUP III. *Marasmus.*—On examining sections, however, of the thyroids classed under the third group, viz. *Marasmus*, the marked, and almost constant changes seen in the gland of children

dying in this condition were most striking. I have examined them in ten cases of pure marasmus and they all showed :—

1. A large proportion of the vesicles patent but devoid of colloid.
2. Marked increase of fibrous tissue, frequently intra-vesicular.
3. Marked cell proliferation in a number of the vesicles.

The very marked, constant, and more or less similar changes which the thyroids classified under the group " Marasmus " always presented, led me to wonder if the changes observed were the result of a marasmic condition, or if, on the contrary, an abnormal and diseased state of the gland might not be the chief or *one* of the chief factors in the causation of that disease. Further observation and investigation have in my opinion confirmed this latter view, and led me to believe that the thyroid plays an extremely important part in the nutrition of the infant.

Marasmus.

Having glanced at the structure and development of the thyroid, its chemistry (especially as regards the colloid secretion), etc., let us now see if changes in this gland could in any way account for the atrophic condition found in marasmus. In other words, has this " internal secretion " of the thyroid anything to do with the condition of atrophy so frequently seen amongst the children especially of the poorer sections of the community ?

Marasmus is the name applied to a condition of extreme wasting seen in infancy. It may be associated with some gastro-intestinal disturbance, but very frequently no symptoms, beyond the wasting of the muscles and of the body fat, are noticed ; while a post-mortem examination reveals nothing beyond an atrophic condition of the alimentary tract, though Ruhrah has recently pointed out that the thymus gland is in all such cases also affected.

Many theories have been propounded as to the cause of the condition. Babinsky thought that the disease was due to an atrophy of the mucous membrane of the intestine which interfered with absorption—and hence the general atrophy. Since that time, however, many investigators have disproved this statement. In the majority of cases the changes observed were due to the stretching of the intestinal wall by distension with intestinal gases, and also partly in many cases to post-mortem changes.

Heubner and Rubner, as the result of experiments, formulated the theory that sufficient food was both taken and absorbed, but

that the trouble was due to auto-intoxication, from the decomposition of food in the intestinal tract. Other writers have for the most part adopted this view, and Ruhrah remarks, "We may safely assert that the trouble is not due to the amount of food ingested, nor to the amount absorbed, but is due to mal-assimilation of the food material of the body."

This theory seems to me to be to a large extent a correct one, as no one can have failed to notice that, though marasmic children continue to lose weight, they still seem to take a sufficiency of food, and an examination of the fæces shows these very frequently to be in a normal state. The course of the disease is usually chronic, and in the majority of cases fatal.

The causes which predispose to marasmus in infancy are frequently very obscure, but in the opinion of those best qualified to judge, they may be broadly stated under the following heads:—

I. Constitutional causes.
II. Improper feeding.
III. Bad hygienic surroundings.
IV. Acute disease.

I. *Constitutional Causes.*

These may occur either as the result of prematurity of birth, or of disease on the part of the parent, and consequent inherited weakness of the infant.

As everyone knows, premature children are very difficult to rear. The *reason* for this, however, is not so easy of explanation. The question has recently suggested itself to my mind. Can the condition of the thyroid have any connection with this difficulty?

As noted in our previous description, the gland of a premature child may appear almost normal; very frequently, however, there is a scarcity in the amount of colloid present. As this substance contains the active principle of the gland, it follows that the child must materially suffer from this deficiency; and even in those cases in which the amount appears more or less normal, a defective composition of the colloid secretion has been found to exist. Various observers have shown that age has an important influence on the iodine contents of the gland, and that in infants it contains proportionately the least quantity of this substance. Richardson analysed the thyroids of several children who died immediately after birth, and also those of some prematurely-born infants, and he has never

been able to find in them a trace of iodine or of blood-pressure reducing substance. We may therefore conclude that the thyroid of a newly-born child contains little or no iodine. I have already pointed out in treating of the chemistry of the gland that "the thyroglobulin containing no iodine is proved to be physiologically inert"; it follows, therefore, that new-born and young infants have little or no efficient thyroid secretion. The more premature the child, the greater is the likelihood that no active principle is present in the gland. Not only does prematurity affect the secretion, but even the causes of prematurity, such as disease of the parents (tuberculosis, syphilis, alcoholism) must be taken into account in considering the consequent inherited weakness on the part of the infant. It is a well-recognised fact that children of unhealthy parents are born with feeble resisting power, and with greater predisposition to various illnesses than are the offspring of healthy individuals. We are now in possession of certain facts regarding the thyroid which, I believe, may throw some light on the frequency with which the children of unhealthy parents fall into an atrophic state. It has been observed that during pregnancy there is a marked modification of the thyroid gland. Freund found an augmentation of volume in 45 out of 50 women. It has also frequently been noticed that a suppression of menstruation often produces a swelling of the gland, which disappears on the re-establishment of the menstrual flow.

Such observations are extremely interesting from the fact pointed out by Gautier that menstrual blood contains iodine and arsenic, both of which substances form part of the normal secretion of the thyroid.

It has been noticed also that adults who suffer from tuberculous disease, chronic alcoholism, or syphilis, have almost invariably sclerosis of the thyroid, and this condition has been found to exist also in the newly-born offspring of tuberculous mothers. I have also found well-marked sclerosis in the thyroid of an eight months fœtus whose mother was syphilitic. John Thomson, in an article on Cretinism, says: "In the few cases in which cretin women have become pregnant and delivery has taken place, the infant, although not myxœdematous, has been either atrophied or hydrocephalic at birth, and has died soon afterwards." It seems probable, therefore, that an unhealthy parentage may produce degenerate changes in the thyroid of the offspring, and if, as I think, this gland in infants

plays a very important part in the assimilation of food, we can in such cases readily account for the marasmic condition of such children.

II. *Improper Feeding.*

It is a noteworthy fact that children fed at the breast of a healthy mother seldom, if ever, suffer from marasmus, if the surroundings be at all favourable; while often, even under unfavourable hygienic conditions, an entirely breast-fed child will thrive splendidly. In almost every case it is the artificially-fed infant that is prone to suffer from atrophy, and, the more unsuitable the feeding, the more apt is the child to become affected. Further, when once this condition of atrophy has set in, and digestion has consequently been seriously weakened, the infant continues to waste, even when supplied with more wholesome food. This is especially true of infants under 4 or 5 months of age.

It must be admitted that occasionally in Out-patient work at the Sick Children's Hospital one finds an atrophic baby who is being brought up on the breast; on going into the history of the case, however, one invariably finds either that the infant is also being supplied with other very unsuitable kinds of nourishment, or that the mother is in an unhealthy state.

Children brought up on the bottle are in many cases very difficult to rear. One of the chief reasons for this is no doubt found in the fact that cow's milk, on account of its large excess of casein, forms, during digestion, a much denser clot in the stomach than human milk. "The proteids of milk are of two kinds—casein and albumen—and a reliable estimate has given their proportion as six parts of casein to one of albumen in cow's milk, but as equal in human milk. When one remembers that albumen is a much more easily digested form of proteid than casein, it is evident that there is here an important practical difference between the two milks."

It will therefore be evident that in most cases, and certainly in that of all feeble children, pure cow's milk will be found to disagree, and to require some modification to render it more suitable for the digestive powers of the infant. Even after trying all the known methods of modification—dilution, peptonising, etc.—one still frequently finds that the child does not thrive, because, as Hutchison puts it, "a truly 'humanised' cow's milk is a chemical impossibility."

But apart from the foregoing considerations, which obviously indicate points of superiority possessed by human milk when contrasted with cow's milk for the feeding of infants, it has also been shown that *thyro-globulin* is excreted along with the milk of the human subject; the child receiving in this manner the amount of thyro-globulin necessary for its metabolism. This seems a very essential provision when we consider the nature of the thyroid secretion of a child at birth, and for some few months afterwards. There being little or no iodine, there is therefore little or no thyroidin in the gland.

In the case of a calf, however, the thyroid gland contains iodine even in utero, as well as the substance which increases the pulse-rate and reduces blood-pressure.

Such a comparison is extremely interesting, as it seems to point to the probability that, as the calf is already well supplied with thyroidin, cow's milk will not in all likelihood contain the same amount of that substance as human milk—a substance which in my opinion is necessary for the well-being of the infant, and for the assimilation of its food.

Before leaving this subject, I may mention still another fact which seems to me to point to the great influence exercised on the growth of the child by the thyroid secretion contained (even in small amount) in human milk. Why is it that *mixed* feeding (if the mother be healthy) is preferable to *complete artificial* feeding? If the mother be unable for any reason to do more than give the child the breast at night, while during the day it is artificially fed, the infant is nevertheless found to thrive very much better than when fed solely on the bottle. Of course the obtaining of two "natural feeds" in the twenty-four hours must in itself be beneficial; but the mere quantity taken does not seem to me proportionate to the great good received. May the benefit not be largely due to the child's obtaining from the mother's milk a certain amount of thyroid secretion which very materially assists the assimilation of the artificial foods?

III. *Unhealthy Surroundings.*

Infantile digestion is undoubtedly influenced by its surroundings. Infants born in poor circumstances breathe the foul air of crowded and badly ventilated dwellings; they are exposed to cold; they frequently lie night and day in contact with damp and filthy napkins; while at the same time they are strangers to fresh air and

sunlight, and also often to all the care and numerous little attentions which are such important factors in the preservation of their health. Warmth, cleanliness, fresh air, and sunlight beyond doubt greatly influence the digestive processes. Why do we so seldom find marasmus in the children of well-to-do people who can afford all the necessary comforts for their infants? These children may not thrive well, they may even be exceedingly difficult to rear, but we very seldom see any well-marked cases of marasmus amongst them.

Considering marasmus, then, from the point of view of degenerative changes in the thyroid gland, let us try to find out more exactly what influence favourable or unfavourable surroundings might be likely to have on the progress of this disease.

This may perhaps be best brought out by observing the effect of good hygienic conditions on thyroidectomised animals.

Swale-Vincent and Jolly, in their paper on the "Thyroid and Parathyroid," say that they found it possible to keep thyroidectomised animals alive for a prolonged time by careful regulation of their surroundings—by warmth, cleanliness, and fresh air—while, on the other hand, if the animals were kept in badly-ventilated and cold cages, they very quickly developed unfavourable symptoms and died.

Observations made by physiologists on animals during a state of inanition are also interesting in this connection, as from all such experiments one main fact emerges. Schäfer states it thus: "For a considerable time, as a result of the oxidation of fat and body proteids, the temperature of a fasting animal is maintained at about its normal amount. Towards the end of starvation, however, the temperature begins to sink and finally rapidly falls, the meaning of this being that the animal has now practically exhausted all the nutriment which it can take from the tissues and that the amount of oxidation has become reduced, so that the temperature is no longer capable of being maintained at normal. The change is also in part due doubtless to the fact that the heat regulating functions of the nervous system are beginning to break down in consequence of the deficiency of nutriment. It has been suggested that an animal dying of starvation practically dies of cold; and it is undoubtedly true that the life of a starved animal can be prolonged considerably by the employment of artificial warmth, since this diminishes the amount of oxidation necessary for maintaining the animal heat and thus economises the energy-producing substances

within the body; but it is of course not possible for the artificial warming of an animal to prolong life to any great extent under circumstances of complete deprivation of food." Now a marasmic child is in much the same condition as a starving animal; true, the child receives food, but as this food is not assimilated it is useless for purposes of nutrition. We are not surprised, therefore, to find the same symptoms and results in both cases; and that surroundings and conditions which tend to the prolongation of life in such animals are also of value in the case of the human subject.

IV. *After-effects of Illness, e.g. Pneumonia, etc.*

We have shown in our sections the results of the action of toxic agents on the thyroid gland. In going over the "*acute diseases*" and noticing the great changes which frequently take place in the thyroid as the result of such toxic action, one can quite understand that the gland may become so damaged as to be unable to properly fulfil its functions.

It has been pointed out by several observers that cretinism may supervene after some acute disease. This we can well understand, though deficiency in the thyroid secretion does not of course necessarily lead to cretinism. It is a recognised clinical fact that numbers of children, after an attack of, say, broncho-pneumonia or acute diarrhœa, suffer subsequently from an apparently disordered digestion and gradually become atrophic. I am inclined to think that this condition may in many of those cases be largely due to the degeneration of the thyroid, which, as a consequence, fails to produce a sufficiency of the necessary internal secretion. Such thyroids show under the microscope a great similarity to the thyroids of children dying from pure marasmus.

Such, then, are the reasons which lead me to believe that the thyroid secretion plays an important part in this condition of marasmus.

I shall now state what the results of my treatment based on this theory have been; for, after all, this is the essential test of the real value of these observations. The most experienced observers of such cases agree as to the almost total hopelessness of recovery when once a true state of atrophy has set in; and statistics amply bear this out, for they show an appalling infant mortality from this disease.

Treatment.

I have had the opportunity of treating a number of cases in the Out-patient Department, but I have also, through the kindness of the physicians to the Hospital, been allowed to treat in the wards six well-marked cases of marasmus. These cases are of special interest and value for this reason, that they all had been under treatment in the wards for some time previously, and had all slowly but steadily lost weight. In order to make the test as complete as possible I also continued exactly the diet which had been given in the ward, and simply added ⅛ to ½ gr. of B. and W. Thyroid Tabloids.

CASE I. T. O., aged 3 months—an only child—was admitted to the Sick Children's Hospital on February 10th, 1906. The child appeared healthy at birth. For the first month he was on the breast, but was subsequently put on artificial diet as the mother had to go to work.

As the infant was not thriving and suffered from frequent vomiting he was brought, when 3 months old, to the Hospital. On account of the vomiting, and well marked gastric peristalsis, the case was considered to be one of pyloric stenosis. The child was carefully dieted and the stomach washed out frequently, and after admission he was sick only once; but although vomiting had ceased and food was well taken, the child did not thrive and steadily lost weight.

The weight on admission was 6 lb. 12 oz., and at the end of the fourth week the child had lost 12 oz., being then only 6 lb.

At this stage he appeared very low, drowsy, skin dry and wrinkled.

Thyroid was now administered (gr. ¼ t. i. d.), the same diet as formerly being continued. The first change noticed was that the child became brighter and the temperature, which had previously been markedly subnormal, rose to 99°. Three days after thyroid treatment commenced he was weighed and was found to have gained 2 oz.; three days later a further gain of 6 oz. was registered, and at the end of two weeks the weight was 7 lb. 1 oz.—a gain of 17 oz. From this time onward the child slowly but steadily improved. Slight attacks of diarrhœa occasionally retarded progress, and on one occasion the thyroid had to be discontinued for two weeks

owing to a more severe attack. Treatment ultimately ceased on June 29th, the weight then being 8 lb. 8 oz. Thus the child continued the thyroid treatment for nearly 3½ months, and in that time put on 2 lb. 8 oz. Since then he has improved steadily, and was sent out at the end of September weighing 11 lb.

CASE II. C. B., aged 3 months, and weighing 7 lb. 2 oz., was admitted to the Hospital on December 27th, 1905. She had been brought up on cow's milk, but had not thriven, and although after admission she was carefully dieted, she was taken out of Hospital on January 16th unimproved, her weight having fallen to 6 lb. 12 oz.

On February 1st she was readmitted to Hospital with a bad prolapse of the bowel. Careful dieting was again carried out, but the child continued to lose weight. The prolapse improving, she was again sent out on February 13th, and came to me in the Out-patient Department. Her weight was then 6 lb. 8 oz. The same dieting which had been given in the ward was strictly enjoined: nevertheless, during the ensuing fortnight the loss in weight steadily continued till on March 7th she was reduced to 6 lb. 4 oz. Thyroid treatment was then begun (with the same diet), and at the end of two weeks she had gained 10 oz. Shortly afterwards she was readmitted to the ward, the same treatment as to thyroid and dietary being continued. The child steadily gained, and at the end of 10 days she was sent out, her weight standing at 7 lb. 9 oz. She has since then attended at Out-patients, her weight on May 5th being 8 lb. 14 oz. This child, on thyroid treatment, had thus put on 2 lb. 10 oz. in two months.

CASE. III. M. C., twin, aged 4 months, was admitted to ward on March 19th, weighing 5 lb. 12 oz.

For the previous fortnight she had been treated in the Out-patient Department and in that time she had lost 3 oz. On March 25th, 6 days after admission, she was put on thyroid, her weight then being 5 lb. 11 oz. One week afterwards she had gained 1 oz. The following week she gained 4 oz., being on April 7th, 6 lb. On April 8th the child became ill and vomited frequently. The temperature rose rapidly and the patient showed symptoms of commencing pneumonia. She became worse and died on April 10th. The post-mortem showed acute broncho-pneumonia.

CASE IV. A. C., twin, aged 4 months, was admitted to ward on March 19th, weighing 6 lb. 12 oz.

She also had been treated in Out-patients for two weeks and had lost 2 oz.

Thyroid treatment was begun on March 25th, the child then weighing 6 lb. 9 oz.

The following week she gained 3 oz. and the week afterwards 4 oz., being, on April 7th, 7 lb. An attack of diarrhœa set in, which proved very troublesome and lasted till April 30th, when the child weighed 6 lb. 6 oz., having thus lost 10 oz. Thyroid was given all the time. The diarrhœa was then checked and the child began to pick up again, putting on in the next three weeks 12 oz.

On May 26th the temperature began to rise, and on the 28th the child was sent to the City Hospital suffering from measles. The weight on day of dismissal was 7 lb.

She was readmitted again on June 14th, having lost weight, and being now 6 lb. 6 oz. Thyroid treatment was again begun, and from that time she made slow but steady progress. She was dismissed on August 27th, weighing 9 lb. 2 oz., after having gained from time of readmittance 2 lb. 12 oz.

CASE V. E. G., aged 5 months, admitted to ward, April 13th, weighing 5 lb. 14 oz. The child was put on a milk and cream mixture with Sod. Citrate but did not improve. She was then put on a milk whey and cream mixture, but, on May 2nd, two weeks after admission, she still remained 5 lb. 14 oz. Thyroid was then given and one week afterwards she had gained 4 oz. She gained nothing the next week, remaining at 6 lb. 2 oz. The following ten days she gained 4 oz., and in the next fortnight 9 oz., being on June 12th 6 lb. 15 oz. Her progress has been slow but steady, at the end of October she weighed 9 lb. 12 oz.

CASE VI. T. H., 4 weeks, admitted to ward, April 15th, weighing 5 lb. 15 oz., and sent out on April 20th, weighing 6 lbs. He was readmitted to ward on May 1st, weighing 5 lb. 15 oz. Thyroid was begun, but slight diarrhœa supervened and the child lost 3 oz. in a fortnight. The diarrhœa was then stopped and the child began to put on weight slowly, being 6 lb. 4 oz. on June 1st when he was dismissed, as some severe cases of diarrhœa were in the ward. The child was brought to Out-patients, and the same dieting was con-

tinued along with the thyroid. The weight went up steadily, and on August 28th he weighed 8 lb. 9 oz. Before going away for holidays in September, I instructed the mother to bring the child up once a week to the ward to be weighed, and to get the weekly supply of thyroid. She came up on September 8th, when the child weighed 8 lb. 13 oz. She failed, however, to return till the 26th of September, and thus no thyroid was given for at least two weeks, during which the child was found to have lost 5 oz., being then 8 lb. 8 oz. He was again taken into the ward on September 27th, but no thyroid was given. The child gradually but steadily lost weight, and on October 18th weighed 6 lb. 15 oz. Thyroid was then begun, and from the first an improvement set in, the child putting on 4 oz. in the week. The next week he lost 3 oz., with slight diarrhœa, but in the succeeding 12 days he gained 8 oz., being on November 12th, 7 lb. 8 oz. Two days afterwards the child appeared unwell and an abscess in the neck developed. This has now been opened. On November 18th the child weighed 7 lb. 4 oz. and is at present still under treatment.

Besides those ward patients, I have notes of twelve cases of wasting children which were brought for treatment to the Out-patient Department. Three of the number have died and a fourth may be described as *in statu quo*—having only made a very slight gain in weight (5 oz. in one month) during treatment.

One of the three children who died came to the Out-patient Department in an exhausted condition, having suffered for three weeks previously from diarrhœa. This was checked, but the child succumbed to a second attack which came on two weeks after thyroid treatment had begun. The second child put on 5 oz. in 16 days, and was doing well; then a severe attack of diarrhœa with convulsions supervened, which terminated fatally.

The third death was that of a little child who attended the Out-patient Department for five weeks and was going on satisfactorily under treatment. She gained steadily and put on 15 oz. in five weeks; unfortunately, however, whooping-cough developed and ultimately broncho-pneumonia, to which she succumbed.

The remaining eight cases are doing well. Five of them may be considered as cured, and the three cases which are still under treatment are all showing satisfactory and steady improvement. Of these eight cases, six were put on thyroid treatment from the first, while the other two were simply dieted (without thyroid) during a period of three

weeks. The two latter children continued to lose weight till thyroid was added, when an improvement became at once observable and has since been maintained. With regard to the six children who were put on thyroid from the first, one hesitates to claim for that treatment the absolute credit of their satisfactory progress, as strict injunctions were also laid down as to feeding, etc., which of course have a most important bearing on infantile health. This latter consideration, however, cannot in any way account for the ultimate good results seen in the children treated in the wards (already described) and the two in the Out-patient Department, as they had all been carefully dieted for some time, but continued to lose weight till thyroid was administered; a fact which seems to show very conclusively that the thyroid plays an extremely important part in the nutrition of the infant.

Now if such good results can be obtained in marasmic cases, the question naturally suggests itself: "Might not treatment by thyroid, if given at the beginning of the condition before much wasting has taken place, prevent to a large extent the further development of the disease?" I have had lately to treat six other cases outside Hospital, in which great difficulty was experienced with the feeding, the children not gaining in weight. Believing that "prevention is better than cure," I early treated those children with thyroid, and have in all of them obtained most satisfactory and beneficial results. Impressed as I am by these collective proofs of the advantages to be derived from treatment by thyroid, I am encouraged to hope that much may thus be done to diminish the great mortality from this condition.

References.

In the course of my paper I have quoted in connection with structure and development from Murray ("Diseases of the Thyroid Gland)," in connection with the chemistry from Richardson ("The Thyroid and Parathyroid Glands"), in connection with marasmus from Ashby ("Medical Encyclopædia," vol. i.), and in connection with diet from Hutchison ("Food and the Principles of Dietetics").

Schäfer. "Text-book of Physiology."
Rurah. *Brit. Med. Journ.* 1903.
Howell. "Text-book of Physiology."
Horsley. *Brit. Med. Journ.* 1890.
Holt. "Diseases of Infancy and Childhood."
Hall White. *Lancet*, 1888.

Westcott. "Disease of Children."
Roger and Garnier. *La Presse Médicale*, 1903.
Ashby. "Medical Encyclopædia," vol. i.
Hutchison. "Food and the Principles of Dietetics."
Thomson. "Medical Encyclopædia," vol. ii.
Murray. "Diseases of the Thyroid Gland."
Berry. "Diseases of the Thyroid Gland"
Richardson. "The Thyroid and Parathyroid Glands."
Edmunds. "The Pathology and Diseases of the Thyroid Gland."
Quervain. "Acute Thyroiditis."
Swale-Vincent and Jolly. *Journal of Physiology*, vol. xxxii., 1905.
Sarbach. "Mitteilungen aus den Grenzgebieten der Medizin und Chirurgie."
Schnorf. Untersuchungen der Milch."

ON THE TEACHING OF OBSTETRICS AND GYNÆCOLOGY

An Opening Address to a Class of Midwifery and Gynæcology in the Edinburgh Medical School

By F. W. N. HAULTAIN, M.D., F.R.C.P.

In commencing a course of lectures on Midwifery and Gynæcology we find ourselves face to face with two subjects which are theoretically intimately associated with one another, but which so far as their practice is concerned are absolutely different, and it may be well to consider them under their varying aspects.

From a theoretical point of view there can be little doubt that the two subjects can be more thoroughly and efficiently taught together in one course. The organs concerned, their method of examination, the origin of the pathological from the physiological, all go to so intimately blend midwifery and gynæcology together that it is impossible that a thorough knowledge of the one can exist without an intimate acquaintance with the other.

To the gynæcologist the question of pregnancy is perhaps the most important item in his differential diagnosis; its presence, future possibility, or as an exciting cause of existing conditions, must ever assert themselves, and thus the thoroughly trained obstetrician has distinct advantages over the general surgeon in the finer details of diagnosis and treatment. This is perhaps the most potent factor in maintaining gynæcology as a speciality, and prevent-

ing it from being absorbed in the octopodal grasp of the general surgeon.

In other words, to alienate gynæcology from midwifery is to destroy its very existence and submerge it in the vast domain of surgery, which one cannot help thinking is a retrograde step and therefore strenuously to be combated. It would of course be absurd that all obstetricians should be gynæcologists, as this entails special surgical training, but the converse I maintain is essential, viz. for the efficient practice of gynæcology an intimate knowledge of obstetrics is a *sine qua non*. It must therefore be evident that in a course of study such as we are now commencing, the two subjects of Midwifery and Gynæcology, though in practice so dissimilar, in theory must be considered inseparable.

I therefore take this opportunity of considering in detail in what manner a knowledge of each of these subjects is to be best attained, with special reference to their respective value in medical practice.

To the great majority of you, midwifery must form one of the most important subjects of your medical training, as it may truly be said to form the keystone of medical practice. Success in its practice not only brings with it the lifelong friendship of the mother, but seems also to instil in the popular mind a feeling of intimate knowledge with the constitution of the offspring, acquirable by no other means. It will be thus evident that a complete and thorough knowledge of midwifery, both theoretical and practical, must prove of the utmost value.

To acquire such, three lines of study are essential :—

1. A thorough and complete theoretical grounding.
2. Clinical observation of cases treated by experienced men.
3. Personal practical experience in the management of cases.

These must be considered independently.

1. *Theoretical Training*.—This requires to be thorough and complete, resting on the true scientific foundation of a physiology and pathology which is peculiar to the subjects, and not scamped over by a few lectures and demonstrations on the diagnosis and pathology of pregnancy, and the management of labour and its complications.

It is frequently asserted that the Universities give undue prominence to midwifery by making the course equal to that of the larger subjects of medicine and surgery. On the first blush there seems some reason in this criticism, but when more narrowly investigated such an argument can be easily refuted. Doubtless, medicine and

surgery are much vaster, but it is not so absolutely essential that the intricacies of each of these subjects should be, as in midwifery, metaphorically at the finger tips of the practitioner.

The great majority of medical and surgical problems give ample time for study of their diagnosis and treatment. What practitioner diagnoses and treats effectively at first sight diseases of the nervous system, or indeed the majority of the maladies which go to form the course of medicine? Time is not only on his side, but necessary for their true elucidation and successful handling.

In the same way, how few practitioners ever practise the great bulk of the surgery they are supposed to be *au fait* with at their examinations.

The family obstetrician, on the other hand, may be brought face to face at any moment with any of the dire complications of his subject, and unless his treatment be prompt and to the point, the result may be tragic.

It is thus apparent that the knowledge of midwifery must be complete before one can practise it with an easy mind or hope for success. On the other hand, the amount of medicine, and specially surgery may be fractional, so long as he has a good library at home, and specialists within reasonable distance. To say, therefore, that too much time is given to the smaller subject cannot be the opinion of those who take a broad view of medical education.

To the second factor, viz. "To the clinical observations of cases treated by experienced hands," we must look as the essential factor of true teaching, and one rejoices to see that the General Medical Council are making an attempt to have it placed on a better basis than hitherto.

These suggestions are as follows:—

"That every student should be required to have conducted not less than twenty cases of labour, subject to the following conditions:—

"(*a*) Before the student is allowed to conduct the above-mentioned twenty cases of labour, he should be required to have held the office of Clinical Medical Clerk and of Surgical Dresser; to have attended a course of lectures in Medicine, Surgery, and Midwifery; to have during one month given undivided attendance upon the indoor practice of a lying-in hospital or the lying-in wards of a general hospital; and to have therein attended cases of labour under the

direct supervision of a medical officer of the hospital. He should further be required to produce a certificate from the authorities of the hospital showing that he is competent to undertake the conduct of ordinary cases.

"(*b*) No certificate that the student has conducted the above-mentioned twenty cases of labour should be accepted unless it is given by a member of the staff of a lying-in hospital or of the Maternity Charity of a general hospital."

Though by no means adopting these *in toto*, chiefly on account of their impracticability, one cannot but heartily endorse their efforts on the lines of clinical teaching.

To see cases skilfully managed is the crux of efficient training, and this practically can only be done by residence in a Maternity Charity.

In medicine and surgery, clinical teaching at the bedside has long been looked upon as the only true tuition of the subjects, but until lately no such experience has been considered necessary in midwifery.

This, doubtless, has been chiefly due to the difficulty of presence during confinements, of which the majority take place during the night. This, however, has now been overcome in the bulk of the teaching centres by students' residences forming part of the Maternity Hospitals. The student can thus be taught during the actual progress of the case and acquire valuable knowledge otherwise impossible. Not only does he thus learn the management of normal cases, but he has also the inestimable benefit of seeing the many abnormal and complicated cases which so largely form a hospital clientele. To see two or three normal or abnormal cases skilfully conducted and to do so himself under supervision is of more value than uncountable lectures and demonstrations from the most eloquent teacher, or dozens of cases personally conducted alone. True teaching of clinical midwifery can only be efficiently acquired thus, and one can only trust that the recommendation of the Council will be universally adopted, in so far as hospital residency is required. "Undivided attendance," however, is asking too much from the student, whose time for study is already overtaxed, and seems unnecessary.

The third and last factor in midwifery teaching, viz. "The personal conduction of cases," used to, and still does form in many

instances the only practical experience of the present medical student.

In conjunction with, or rather as a sequence to, the previously described method of clinical teaching, it is of great value in giving experience in the responsibility of conduction of confinements, but in itself it is of minor moment.

The majority of students without previous clinical tuition must attend their cases in a Micawber-like fashion, waiting many weary hours on the chance of something turning up, rejoicing when, by the will of Nature, the advent of the little stranger and its annexa are duly completed and he is able to return to his home surroundings with another case added to his necessary list. Under this regime of teaching the more cases he attends the better, as by dint of experience he will, after attendance on many such unfortunate women, have acquired at any rate a self-taught knowledge of what is required from a common-sense aspect. Such knowledge at the best cannot be considered as efficient teaching, and cannot for a moment compare in value with clinical demonstration by experienced men.

Should several such managements have been observed, it is unnecessary for many cases to be personally attended. Six seems ample to gain sufficient familiarity with the responsibility of practice.

It is not necessary for qualifying purposes that the student personally attend a definite number of pneumonias or scarlatinas, or " set " so many fractures. These he has seen done by experienced men, which is considered sufficient. Why inflict on him, therefore, attendance on twenty cases of labour, which requires the devotion of so much time in his already overburdened curriculum ? To delete personal attendance altogether would, doubtless, be a retrograde step, but it seems to me this could be sooner done without, in the efficient clinical training of the subject, than the attendance at labours conducted on up-to-date lines by experienced hands.

To summarise :—

An efficient training of midwifery is to be acquired by the student—

1. By a full course of systematic lectures.

2. By residency for a month in a Maternity Hospital, after a course of systematic training in midwifery and surgery, and having dressed in a Surgical Hospital, by which means he has acquired a thorough knowledge of aseptic and antiseptic methods.

3. Personal management of six cases on his own responsibility.

This essentially differs from the suggestions of the Committee of the General Medical Council in the following particulars :—

1. That during residency in a Maternity, "undivided attention" is unnecessary and the student may attend the other subjects of his medical course.

2. That the personal attendance on outdoor cases shall go on coincidently with the indoor clinical training, thus permitting his entire clinical midwifery being completed in one month.

3. That six cases personally conducted are sufficient, twenty being quite superfluous.

4. That it is unnecessary for a course of medicine to have been previously attended, as this is taken in the fourth year of study, and after its completion too little time is at the disposal of the student for clinical midwifery.

5. That clinical midwifery may be taken after a short theoretical course of midwifery has been attended. This may be done in the summer of the fourth year.

A training such as this is by no means Utopian and can readily be gained in Edinburgh, thanks to the generous association of the Town and Gown Association with the Maternity Hospital. For an extremely moderate charge, intern pupils of the Maternity Hospital are boarded in a most comfortable, almost sumptuous manner, in a building in direct structural connection with the Hospital, and thus have full facilities of seeing and being taught, on all the cases conducted therein.

Unfortunately, so far, these facilities have not been taken advantage of to the full, these I strongly urge you to grasp, even though as yet they are not compulsory, as I fondly trust they will soon be.

As I have already mentioned, though gynæcology has an intimate relationship with midwifery, it cannot be considered for a moment as of equal importance in general practice, to which, doubtless, most of you will aspire. This is mainly due to the fact that from the magnitude of its surgical requirements it has of necessity become a highly specialised branch of medicine, and quite out of the routine of medical practice, and must be considered as analogous to diseases of the eye, ear, and throat. Further, the almost insuperable difficulties of large numbers of men acquiring the large clinical experience necessary for an efficient knowledge of the subject still further

prevents its adoption as a branch of general medical training from a clinical aspect.

All the student can hope to acquire of a compulsory nature is a general theoretical acquaintance with the subject, and a clinical knowledge of the methods of examination.

At the same time, special optional courses might be attended of clinical gynæcology analogous to those of the ear and throat and skin diseases, where, from the limited number of those attending, increased facilities could be given, so that differential diagnosis and methods of treatment could be efficiently learned.

It is impossible to enter the arena of medical practice fully equipped in all its branches, and in this age of specialism undesirable to attempt. The vast extent of medical and surgical knowledge makes it impossible for one individual to be intimately acquainted with all its branches, and for that reason specialism must continue to increase so long as medicine and surgery develop as they are doing. Gynæcology forms and will continue to form one of the most powerful of these, and it is idle for the general practitioner to hope to stem the tide. A little knowledge is a dangerous thing and only leads to disappointment and heart-burnings with a minimum of remuneration. His " well-to-do " patients know too well the advantages of specialism, and it is a question which rests with himself whether it is better that they should consult with his recommendation than behind his back.

With the many other calls upon his time, and the necessarily limited experience available in his medical training, it is impossible for the young graduate to conscientiously look upon gynæcology as anything but a special subject, and he must treat it accordingly. The wide difference which exists, therefore, between the two subjects of the course we are about to commence must be apparent. Though theoretically inseparable from a teaching aspect, their respective value from a practical point of view cannot but be recognised.

REMARKS UPON OPHTHALMOPLEGIA INTERNA UNILATERALE WITH SPECIAL REFERENCE TO ITS ETIOLOGY AND CLINICAL SIGNIFICANCE[1]

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THE aim of this paper is to show that unilateral internal ophthalmoplegia, even when it occurs as an isolated sign, is often of very considerable practical significance. As a preface to our remarks, we may state that the subject receives scanty attention even in the most recent editions of many standard text-books, that the symptom is often not recognised, and that even when detected its significance is not always appreciated.

We propose to record briefly several cases of unilateral internal ophthalmoplegia which we have recently observed, and finally to summarise the conclusions which we feel justified in deducing from a study of our own material and of the literature.

The term ophthalmoplegia interna was introduced by Mr Jonathan Hutchinson,[2] to denote paralysis of the internal muscles of the eye, *i.e.* the sphincter iridis and the ciliary muscle. The paralysis of the sphincter muscle of the iris (iridoplegia) shows itself in dilation and immobility of the pupil (mydriasis), while weakness of the ciliary muscle (cycloplegia) is manifested in defective near vision (distant vision remaining practically unaltered), a consequence of impairment or loss of the ability to accommodate. The ophthalmoplegia may be unilateral or bilateral in distribution and partial or complete in degree. Further, the iridoplegia may be out of proportion to the cycloplegia, while exceptionally the reverse condition is met with. The size of the pupil may afford an indication as to the degree of the paralysis of the sphincter iridis, while the defect of accommodation may be estimated and expressed by the dioptric value of the convex lens which is necessary to perfect near

[1] The thanks of the authors are due to Dr George Mackay, who has courteously placed at their disposal his notes referring to three of the cases cited in this paper.

[2] *Medical Times and Gazette*, 1878, p. 488.

vision after any existing error of refraction has been corrected. In this connection it is necessary to bear in mind that the normal range of accommodation diminishes with increasing years. A table indicating the average dioptric accommodative capacity at different ages has been drawn up by Donders and will be found in all standard works on ophthalmology.

It is a fact of common knowledge that one of the physiological effects of belladonna when taken internally or applied to the skin is to produce dilatation of the pupils and paralysis of accommodation; in other words, a bilateral internal ophthalmoplegia which subsides when the drug is discontinued. That atropin produces a similar transient unilateral paralysis of the internal ocular muscles when applied to the conjunctiva is equally well known. For the present we do not propose to make further reference to the ophthalmoplegia interna which is produced by the so-called mydriatics, but shall confine our attention to cases in which with all likelihood this cause can be excluded and particularly those in which the ocular palsy is of more permanent duration.

The internal ophthalmoplegia which is a not uncommon accompaniment or sequel of diphtheria need not detain us for the reasons, firstly, that it is, so far as we know, invariably bilateral, while, secondly, it is always recovered from.[1] The group of cases in which an internal ocular palsy results in consequence of trauma it is unnecessary to consider, for in these cases, since a direct history of injury is obtained, the diagnosis gives rise to no difficulty.[2] After

[1] Through the kindness of Drs John Thomson and Thin we have had the opportunity of examining a case of unilateral mydriasis in a child aged eight and a half, which was first noticed immediately after an attack of diphtheria when the patient was five years of age. In this case the pupil contracted fairly well both to light and on convergence, and there was no defect of accommodation.

[2] The following case in which an ophthalmoplegia interna resulted from a general trauma as opposed to a direct injury to the eye is of interest. The case which is recorded by Tumpowski (Abstract in *Neurol. Centralbl.*, 1901, p. 907) is that of a girl, aged 11, who, after falling down some stairs and being unconscious for several hours, developed a right internal ophthalmoplegia with slight unilateral ptosis on the same side. The author regarded the condition as probably due to a small hæmorrhage in the region of the oculo-motor centre.

A second case, of which Mr George Berry has told us, suggests, as he remarked, the extreme delicacy of the nervous mechanism of the iris and ciliary muscle. The case was that of an individual who fell from a train which was at the time travelling at forty-five miles an hour. When seen by Mr Berry soon after the accident there was a bilateral internal ophthalmoplegia which he regarded as a consequence of the accident, and which was the only indication of disease he was able to discover. Mr Berry writes us: "This was the sole permanent tangible remains of a certain

a third nerve paralysis the weakness of the internal ocular muscles may persist after the external ocular palsy had been completely recovered from. The history of paralysis of the external muscles will in a case of this kind serve to elucidate the diagnosis.

The great majority of cases of unilateral internal ophthalmoplegia, however, are not to be accounted for by any of the above mentioned causes, and it is to these cases that we wish to direct the reader's attention. The following are the clinical details of such a case:—

CASE I. *A watchmaker, aged* 34, *unilateral internal ophthalmoplegia in right eye of three or four months' duration. Syphilis six years previously followed by late symptoms. Argyll-Robertson pupil on left side.*

J. S., aged 34, a single man and a watchmaker by occupation, was seen by A. H. H. S. in June 1904, his complaint being dimness of vision in the right eye.

The patient stated that some three or four months previously he had noticed that the sight of his right eye was dim and that in consequence he had difficulty when at work in recognising and manipulating small objects. The defect in sight had, he said, persisted *in statu quo* from the time it first attracted his attention up to the date of our examination. Apart from this defect, the patient stated that he felt in the best of health.

The visual acuity was as follows:—

Right eye, $V = \frac{6}{12} + 1$ D. sph. $= \frac{6}{6}$.

For near reading, V + 5 D. sph. = .3 (1), well.

Left eye, $V = \frac{6}{6}$.

For near reading, V = .3 (1), smallest type read without any glass.

In other words, there was defective accommodation amounting to at least four dioptres in the right eye, accommodation in the left eye being normal.

The fields were normal.

Both optic discs were somewhat pale, and on the *right* side there was marked cupping; the vessels were normal.

The pupils were unequal, the *right* measuring 5 mm., the *left* 3 mm. The *right* pupil reacted neither to light nor on accommodation. The *left* pupil, which was not quite round, was displaced a little upwards and inwards, it contracted to 2 mm. on accommodation for a near object but did not react to light.

A few days later the patient was seen by E. B., who made a

degree of 'concussion' at the time—in fact I think the shake to the brain tissue seems to have been either focussed at the centre for pupillary and ciliary contractions, or that this centre can be more readily disturbed in a permanent way by an injury which other parts recover from."

careful inquiry into the history and a systematic examination of the nervous system and other organs, but was unable to detect any evidence of existing disease beyond the facts above mentioned.

On enquiring into the patient's previous health a definite history of syphilis (a hard sore which had left a distinct scar upon the penis) six years previously was obtained. The patient had at the time undergone six months' treatment. Subsequently a rash appeared upon the chest and there had been some loss of hair. At a later date there had been some ulceration of the mouth. The scars of these ulcers were to be seen at the time of our examination. In 1902, for a period extending over six months, the patient had suffered from headaches and " dizzy turns " which had yielded to treatment (? antisyphilitic remedies) and had not troubled him since.

Apart from syphilis, the patient stated that he had had no serious illnesses. There was no history of alcoholic excess. The patient stated that his father was an excitable, nervous man. The family history was otherwise excellent, and so far as he knew there had been no case of nervous disease, paralysis, fits, or insanity among his relatives.

There is the strongest possible evidence to show that the ophthalmoplegia in this case was due to syphilis, for in the first place the patient had undoubtedly suffered from that disease six years previously; while, secondly, the presence of the Argyll-Robertson pupil in the right eye, when taken in conjunction with this fact, affords positive evidence of a subsequent syphilitic affection of the nervous system. Is it not legitimate to conclude that the ophthalmoplegia was dependent on the same cause ?

A point of no little interest in the case was the circumstance that the patient, a watchmaker by occupation, was in the habit of working constantly with his right eye. It may be that the excessive use of the eye had determined a local degeneration in certain neurons predisposed to degenerate in consequence of the previous syphilis. This indeed is the explanation which Edinger has advanced to account for the various nature of the initial symptoms in many cases of tabes and general paralysis.[1] On the other hand, however, it is quite possible that the affection of the right eye was merely a coincidence, and that it was the inconvenience produced thereby in connection with his very special work which had compelled the patient to seek medical advice.

[1] L. Edinger, "Die Aufbrauch-krankheiten des Nervensystemes," *Deutsch. med. Wochenschr.*, Nos. 45, 49, 52, 1904, Nos. 1 and 4, 1905. In this paper the author elaborates his views propounded ten years previously.

CASE II. *Cerebral syphilis. Left internal ophthalmoplegia.*

A clerk, aged 32, was seen in consultation by E. B. in December 1904. For a week previously he had been complaining of intense headache, which was becoming worse and was especially severe at night. On several occasions during the preceding few days he had vomited. Nine months before he had suffered from headache and left internal strabismus which had disappeared under potassium iodide. In 1894 he had had a chancre, but no history of subsequent syphilitic symptoms was obtained.

Upon examination he was found to have a very slight left hemiplegia with an increased knee-jerk and extensor response on this side, but no sensory impairment. The right pupil measured 2½ mm. and was immobile to light, but contracted slightly on accommodation. The left pupil, which was widely dilated, measured 7 mm. and was immobile both to light and on convergence. There was slight ptosis on the left side, but with this exception there was no impairment of any of the extra-ocular muscles. The patient could read very small type with the right eye, but with the left eye he was unable to decipher print of considerable size although his distant vision was good, showing that he had marked paralysis of accommodation. The optic discs presented a perfectly healthy appearance.

Large doses of potassium iodide, together with mercurial inunctions, were advised. The patient's medical attendant wrote a month later to say that he had taken 40 grains of potassium iodide, three times a day, for two or three weeks, when the dose was gradually reduced, that he had had no headache since the day following our consultation, and that he was now at work and feeling better than he had done for months.

These two cases will serve to demonstrate that unilateral internal ophthalmoplegia may be produced by syphilis. A study of the literature, however, justifies a much more dogmatic statement upon this point, as will be seen from the following references.

Jonathan Hutchinson[1] in 1878 described 8 cases of ophthalmoplegia interna, in 5 of which the symptoms were bilateral. In 5 of these cases there was a certain history of syphilis. Alexander[2] of Aachen in the same year refers to 28 unilateral cases which he had himself observed during the course of eleven years, in 19 (= 68 per cent.) of which syphilis was certain. In 5 (= 18 per cent.) of the remaining cases previous syphilitic infection was probable. While in 4 cases (= 14 per cent.) in which no indication of previous syphilis was obtained the affection was possibly rheumatic. This author remarks

[1] *Loc. cit.*

[2] *Berlin. klin. Wochenschr.*, 1878, p. 302.

that the earlier symptoms of syphilis in these cases are often slight and evanescent.

Fr. Hosch[1] published 5 cases in 1888, in every one of which there was a history of venereal disease, the exact nature of which is not however stated; while Keeps,[2] who writes the article on the internal ocular muscles in Posey and Spiller's recent text-book (1906), states that he has met with six cases in all of which a history of syphilis was obtained. The statistics of Alexander, based as they are upon so many cases, are particularly striking. In studying these statistics it must be remembered that Aachen has a world-wide reputation for the treatment of syphilis, a circumstance which has to be taken into account in considering the very large percentage in which Alexander obtained a history of the disease. Admitting this point, however, the unusually large number of cases met with by this observer in the course of a few years shows the intimate relationship of syphilis as an etiological factor. It is of course unreasonable to expect that in every syphilitic case a history of syphilis will be obtained, and especially is this so when the condition occurs in the female sex.

In the following case there is no history of syphilis or of later symptoms of that disease, although certain indications suggestive of a parasyphilitic affection of the nervous system were present.

CASE III. *Left ophthalmoplegia interna. Argyll-Robertson pupil on the right side. Absence of tendo-Achillis-jerks.*

Miss Z., an unmarried lady, aged about 38 (?), was seen by E. B. in November of this year.

The patient complained of the disfigurement caused by the large size of the pupil of the left eye, together with defective vision in this eye. She stated that she had had no definite illnesses but for some months past she had been nursing a relative and had had considerable worry and anxiety.

Upon examination, the left pupil was found to measure 6 mm., and was immobile to light and on accommodation. The right pupil measured 3 mm. and did not respond to light though it contracted on convergence. The patient could not read small print when she closed the right eye.

Dr George Mackay, who had examined the patient on the same day and on two former occasions, has kindly informed us that in

[1] *Correspondenz-Blatt f. schweizer Aerzte*, 1888, p. 97.

[2] "The Eye and Nervous System," edited by Wm. Campbell Posey and William G. Spiller, 1906.

March 1894 the pupils and accommodation were unaffected, but that when he saw the patient again in September 1900 they were unequal. "When facing the window they were unequal (R. = 5.5 mm., L. = 3.5 mm.), though they were practically of the same size in a subdued light. On convergence, R. = 4.5 to 5 mm. (about), L. = 3 mm. (about). The patient was not complaining of accommodative difficulty and defect not noted. In November 1906, facing window, R. = 3.5 to 4 mm., L. = 6 to 6.5 mm. No apparent reaction to light in either. On convergence to 10 in., R. = 3 mm., L. = 6 mm. (contraction doubtful). Presence of accommodative power proved in each eye by retinoscopy—R. $\bar{c}$ + 0.5 D. sph = $\frac{6}{5}$ and J. 1 up to 8 cm. from face. L. $\bar{c}$ + 1.25 D. sph = $\frac{6}{5}$ and J. 1 up to 20 cm. from face with this lens but requiring + 3 D. sph. added to get J. 1 at 8 cm."

Upon examination the only further indication of disease which was discovered was the absence of both tendo-Achillis-jerks. No history of symptoms suggestive of syphilis, of any nervous affection, or other illness of importance was obtained. On the fact elicited, however, viz. the Argyll-Robertson pupil on the right side, and the absence of both tendo-Achillis-jerks, there seemed to be considerable grounds for suspecting that the patient was the subject of a parasyphilitic affection of the nervous system, however unlikely such a supposition might at first sight appear.

Uhthoff's [1] recorded experience, which still remains for consideration, contrasts somewhat strikingly with that of the other authors to whom we have referred. Among 30 cases which he personally observed, a variety of causes were noticed as will be seen from the following table :—

Syphilis	8 cases	(6 unilateral)	23.3	per cent.
Tabes	3 ,,	(2 ,,)	10	,,
G.P.I.	2 ,,	(1 ,,)	6.6	,,
Trauma	2 ,,	(2 ,,)	6.6	,,
Cold	1 case	(unilateral)	3.3	,,
Cerebral tuberculosis	1 ,,	(bilateral)	3.3	,,
Cerebral tumour	(?) 1 ,,	(,,)	3.3	,,
No cause detected	12 cases	(5 unilateral)	40	,,

In both the cases in which trauma was the cause, dislocation of the lens and severe injury to the eye had resulted. The etiological evidence in the one case attributed to cold is convincing. The point which immediately attracts attention is the large number of cases in which no cause was detected (12 cases), and the com-

[1] *Berlin. klin. Wochenschr.*, Jan. 1886, p. 55.

paratively small proportion in which evidence of syphilis was forthcoming (13 = 40 per cent. if all of the tabetics and paralytics are included).

With regard to the cases in which no cause was detected, Uhthoff notes that they all occurred in young adults between the ages of 20 and 30; that in all there was a well-marked neuropathic factor, and that the *disturbance of vision and mydriasis disappeared quickly in most of these cases.* Thus in one instance it scarcely lasted a day, while in the others with one exception it had gone in a few days.

The circumstance that in these cases in which Uhthoff was unable to detect an evident causative factor, the ophthalmoplegia was of short duration, distinguishes them from the majority of those which are due to syphilis, since in the latter the ocular palsy is usually (according to Alexander, always) permanent.[1]

To sum up :—From a consideration of the data which have been exposed in the preceding pages, it seems justifiable to conclude that ophthalmoplegia interna unilaterale persistens in the very great majority of instances indicates a syphilitic affection of the nervous system. Further, we feel justified in applying the expression which Babinski [2] employed in referring to the Argyll-Robertson pupil and in affirming that the existence of an ophthalmoplegia interna unilaterale persistens which is due to syphilis stamps the individual as a candidate for tabes, general paralysis, and cerebro-spinal syphilis.

It is interesting to note that Jonathan Hutchinson,[3] so long ago as 1876, alludes to a possible association of this group of symptoms with the early stages of locomotor ataxia, a relationship which is acknowledged by Gowers, von Monakow, Oppenheim, and other observers who have paid special attention to the point. This being so, the question arises, in what proportion of these cases in which ophthalmoplegia interna occurs as an isolated sign do further symptoms of tabes, general paralysis of the insane, and cerebro-

[1] The following case, recorded by Donath, shows that the internal ophthalmoplegia which results from syphilis is not always permanent as Alexander affirms. The case is of special interest, since it shows the length of time that may elapse before further symptoms develop. The patient, a man in whom no history of syphilis was obtained, developed an internal ophthalmoplegia first in one and then in the other eye. The paralysis disappeared after a few months. Five years afterwards a bilateral Argyll-Robertson pupil was observed, and five years later still the patient developed G.P.I. and died in six months (*Wien. klin. Wochenschr.*, 1901, p. 706).

[2] Babinski et Charpentier, "De l'abolition des réflexes pupillaires dans ses relations avec la syphilis," *Bull. et Mém. de la Société des Hôpit. de Paris*, Séance du 17 mai 1901.

[3] *Loc. cit.*

spinal syphilis subsequently develop? The only data bearing upon this point which we have been able to discover are those furnished by Alexander's material. This author found that at least a third of his cases eventually developed mental symptoms. It must be remembered, however, that many cases remain stationary for long periods of time, while it is more than likely that in some there is no further tendency to progress. There are no available data, however, upon which to base a dogmatic statement regarding this point. The same difficulty arises in connection with the Argyll-Robertson pupil.

The next case is of interest, since it raises the question as to the attitude which is to be adopted in the case of an individual with unilateral internal ophthalmoplegia who comes before a medical man to be examined for life insurance.

CASE IV. *Unilateral internal ophthalmoplegia in an applicant for life insurance who presented no further indication of disease.*

A male, aged 40, was examined for life insurance by E. B. on February 7th, 1906. Excepting for the fact that his mother had suffered from melancholia for some months before her death, both the family and personal history were all that could be desired. The applicant's physical condition also was in every way satisfactory; it was noticed, however, that one pupil was markedly dilated and immobile. On enquiry it was ascertained that six years previously the applicant had consulted Dr George Mackay because of dimness of vision in this eye which he attributed to working near a bright electric light, which Dr Mackay had told him, so the patient stated, was due to a defect of accommodation. A report from Dr George Mackay, whom we have to thank for the following extract from his notes, confirmed the patient's statement as to the defect of accommodation:—

"Mr X. was seen in *March* 1900. Four weeks previously, after much exposure to an arc lamp daily for a week, he felt a slight sense of strain in using left eye, no headache, no sickness.

"Distant vision, R. $\bar{c}$ — D. ax. hor. = $\frac{6}{9}$ fairly.
L. $\bar{c}$ + O. 5 D. ax. vert. = $\frac{6}{9}$.

"Near vision, R. = J. 1 to 15 cm. easily.
L. = J. 1 to 37 cm., requiring + 1.5 D. sph. to equal R.

"'Slight dilatation' of left pupil.

"In *November* 1906, R. about 3.5 mm., fair light.
L. ,, 3.5 mm., ,,

"Accommodative weakness of left eye as before.

"Fundus normal.

"In apparently perfect health."

The iridoplegia was distinctly in excess of the cycloplegia, it will be observed, but even taking this into account, the circumstances that unilateral internal ophthalmoplegia is in the vast majority of cases due to syphilis, that general paralysis is a rapidly fatal disease, and that the applicant's mother had suffered from mental symptoms, in the interests of the company it was considered necessary by E. B. to advise the addition of an extra. The same question arises in relation to reflex iridoplegia and life insurance.

There remains still another point to which we shall refer and which appears to us to be of no little possible interest from a medico-legal standpoint. Ophthalmoplegia interna unilaterale persistens is, we believe, the only objective sign of organic nervous disease which it is possible to closely simulate. Let us illustrate our meaning by citing a hypothetical case.

An individual who has recently passed through a railway accident claims damages and presents himself for examination. He is, it may be, suffering from symptoms indicative of a traumatic neurasthenia. Nothing suggestive of organic disease is detected with the exception of a unilateral internal ophthalmoplegia. The dilatation of the pupil and dimness of vision he states appeared almost immediately after the injury, and no doubt he will be able to produce evidence to show that the mydriasis was only noticed after the accident. If such a history was obtained, and if there was no further indication of structural disease, the examiners' suspicions would be immediately aroused, for is it not possible by the introduction of a mydriatic into the eye to produce and maintain the mydriasis and defect of accommodation ? If the paralysis of accommodation was complete, and still more so if there was a maximum dilatation of the pupil, suspicion of possible fraud would receive still further support, for in disease the paralysis of the ciliary muscle and the mydriasis are rarely if ever so complete as after the introduction of a mydriatic. Examination of the cerebro-spinal fluid and the detection of a lymphocytosis would determine the syphilitic origin of the ophthalmoplegia ; such a procedure, however, is for various reasons scarcely practicable in medico-legal cases.

In the two following there was well-marked mydriasis, while the cycloplegia which was present was only slight in degree.

CASE V. *Unilateral internal ophthalmoplegia. Subsequent development of tabes dorsalis. History of a chancre (? syphilitic) six years previously.*

A bank clerk, aged 30, consulted E. B. in May 1905, complaining of dimness of vision, pains in the legs, hyperæsthesia of the skin of the legs and trunk, and occasional diplopia. Eighteen months previously he noticed that there was something the matter with his sight, and on looking into a glass noticed that his left pupil was larger than the right. In June 1904 he consulted Dr George Mackay, who has kindly furnished us with the following note as to the patient's vision at that time:—

"Distant vision almost $\frac{6}{6}$ in each eye, no refractive error.

"Near vision, R. = J. 1, L. $\bar{c}+1$ D. sph. = as easily as with R. L. pupil = 6.5 mm. facing light. Circular. No adhesions. Immobile to light, contracting slightly on convergence.

"R. pupil = 5 mm. facing light. Not reacting briskly to light, fairly well on convergence.

"No paralysis of the external muscles, no diplopia for distant objects, only some blurring in near work, *e.g.* writing. Fundus normal."

On some days patient says that his pupils were equal. Excepting for occasional diplopia no further symptoms developed until eleven months later, when he began to be troubled with sharp and momentary pains in the legs and a boring pain in the lower part of the back. Ever since that time he had experienced a hypersensitiveness of the skin of the legs and lower part of the trunk. He had in addition experienced some delay in micturition.

The patient was obviously a neurotic subject. Upon examination the pupils were found to be equal in size and dilated, measuring 6 to 7 mm. They did not respond to light, but contracted fairly well on accommodation. The patient could read small print held at a distance of 6 inches with either eye, *i.e.* there was apparently no defect of accommodation. The left knee-jerk was absent, the right knee-jerk and both tendo-Achillis-jerks were present and about normal in activity. The patient's medical man wrote: "He came to me about six years ago with an old gonorrhœa. I found a scar on the penis which he said a Glasgow doctor had pronounced to be a soft sore and had burnt with something caustic. There was no real hard sore when I saw it, but there was some hardness in the scar, and I put him on a course of mercury and advised him to keep at it. He had no secondaries as far as I know. As regards the ocular paralysis, I put him on large doses of K. I., gr. 30, t. i. d., and he took it like a syphilitic. The pupil regained its natural size, but remained rather sluggish both to light and on convergence."

The patient was seen again in consultation by E. B. in September 1906, when it was evident that the tabetic process had advanced considerably. His gait was then markedly ataxic, he had occasional incontinence of urine, the deep reflexes in the lower extremities had disappeared, and there was extensive loss of sensation over the legs and lower part of the trunk. He was suffering in fact from ataxic tabes of a progressive type.

In this case therefore the first symptom of tabes had been dimness of vision and a unilateral mydriasis. It may be that the patient had at that time a cycloplegia which had been pronounced largely recovered from,[1] but the fact remains that when the patient was seen by Dr George Mackay six months later the accommodative defect in the left eye amounted to only one dioptre. Since there was not much difference in the size of the pupils at this time, and since distant vision was equally good in the two eyes, Dr Mackay felt certain that the defect in near vision was due to a defect of accommodation and was not to be accounted for by the slightly larger size of the pupil in the left eye.

CASE VI. *Left internal ophthalmoplegia which was recovered from in a married woman, aged 37. No evident cause, but a history of a series of miscarriages following marriage.*

Mrs M., aged 27, seen by E. B. at Leith Hospital on November 9th, 1904, complaining of dimness of vision in the left eye. Five months previously, while convalescing from an operation for varicose veins, she noticed that her sight was dim. Although the dimness of vision persisted from that time, it was only ten days ago she discovered by chance that it was the sight of the left eye that was defective. Her mother had noticed that her eyes had "looked different" for some time previously. The patient had never put any drops in her eyes.

On examination, the left pupil measured 6½ mm. and was immobile to light and on accommodation, whereas the right measured 4½ mm. and responded to light although not actively, the contraction on accommodation being good.

The ophthalmoscopic appearances were normal. The visual acuity was tested by A. H. H. S., who reported :—

"Left eye, V. $= \frac{6}{12}$. H.M. = 1 D.

V. $\bar{c}$ = 1 D. sph., and through a small aperture = $\frac{6}{6}$ partly.

[1] "Total ophthalmoplegia interna due to syphilis may under antispecific treatment give way to a condition of merely reflex iridoplegia" (Ferrier, *Lumleian Lectures*, 1906, p. 115).

"Patient reads J. 12 $\bar{c}$ + 1 D. sph., and with the addition of a small round aperture of about 3 mm. can read J. 2 slowly.

"Right eye, V. = $\frac{6}{x}$ partly. H.M. = 1 D., with + 1 D. sph. she reads J. 2 and J. 1 slowly.

"The degree of mydriasis in the left eye is much in excess of the loss of accommodative power, but there is partial paralysis of accommodation present."

A very careful enquiry and examination failed to reveal any further evidence of disease apart from symptoms of flatulent dyspepsia which had been present for some months and presented none of the features of crises.

The patient stated that she had been married 7 years, that she had had two children, the elder dying at the age of 5 of inflammation of the brain, while the younger, who was aged 3, was alive and well. She had had three miscarriages at three months, three months, and six months respectively before the first living child was born. She said that her hair is much thinner than before marriage and that she has been somewhat subject to sore throats of late. There was no history of a skin rash, and no evidence of syphilis was found on physical examination though carefully looked for.

By November 16th the left pupil was considerably smaller than it had been a week previously, and by November 23rd it was much the same size as its fellow.

There was no history of the use of a mydriatic in this case, and the duration of the mydriasis was considerably longer than that which is so produced. Again, there was no history of trauma nor indeed of any other cause. The history of miscarriages was somewhat suggestive of previous syphilis, but no further indications of that disease were elicited.

In conclusion it may not be out of place if we make a brief reference to the views advanced as to the possible seat of the lesion which produces the symptoms under discussion.

Jonathan Hutchinson,[1] from theoretical considerations, was of opinion that the lesion was probably situated in the ciliary ganglion.[2] In this connection it is of interest to note that Hensen and Voelckers[3]

[1] *Loc. cit.*

[2] Ferrier in his recent *Lumleian Lectures* (p. 115) favours the view, which Marina upholds from extensive pathological observation, that the lesion which produces the Argyll-Robertson pupil is situated in the ciliary ganglion. After discussing the available evidence he remarks: "There is therefore nothing improbable in the assumption that in tabes the ciliary ganglion and nerves are so affected that though they cannot transmit the reflex impulse of light to the sphincter pupillæ they can readily allow the more powerful stimulus associated with accommodation to pass through."

[3] *Archiv. f. Ophthalmol.*, Bd. xix. S. 156.

showed that it was possible to produce accommodation by stimulating the ciliary ganglion attached to an enucleated eye. They demonstrated this point not only in the eye of dogs, cats, and apes, but also in that of man. Further, from experimental evidence, which space does not allow us to refer to, these observers concluded that the centres for the ciliary muscles and iris lie in the anterior part of the third nerve nucleus, a view which has obtained support from clinical observations.

Hosch,[1] who among others regards the lesion as central, advanced the view that the pathological process is a primary nuclear degeneration, very possibly predisposed to by a syphilitic endarteritis. Paul Schultz,[2] on the ground of experimental research, concluded that internal ophthalmoplegia which is a consequence of an affection of the ciliary ganglion or the short ciliary nerves may be distinguished from that which is caused by a lesion on the cerebral side of the ganglion by the fact that the pupil in the latter case contracts under physostygmin, while in the former case it fails to do so. In several of our cases in which we had an opportunity of observing the effect of eserin, marked contraction of the pupil occurred; hence if Schultz's conclusion is correct, it would appear that the lesion which had produced the ophthalmoplegia in these cases was situated on the cephalic side of the ciliary ganglion.

A post-mortem examination made by Alexander in one of his cases disclosed multiple small foci of softening throughout the brain. A case of ophthalmoplegia examined many years ago by Gowers does not help us much in arriving at a conclusion as to the situation of the centre for the sphincter iridis and ciliary muscles, since the external muscles of the eye were also paralysed. Uhthoff is stated to have met with three cases of internal ophthalmoplegia in which a basal lesion in the region of the interpeduncular space was found post-mortem. We have been unable to ascertain, however, whether in these cases the external muscles were unaffected.

Summary and Conclusions.

1. By internal ophthalmoplegia is understood a paralysis of the intra-ocular muscles, viz. the sphincter iridis and ciliary muscle.

[1] *Loc. cit.*

[2] "Ueber die Wirkungsweise der Mydriaca und Miotica," *Archiv. f. Anat. u. Physiol.*, 1898, p. 74.

2. Paralysis of the sphincter iridis (iridoplegia) shows itself in a dilatation of the pupil (mydriasis), which is immobile to light and on convergence. Weakness of the ciliary muscle (cycloplegia) is manifested by defective accommodation, *i.e.* a convex lens has to be used in order to obtain perfect near vision.

3. A temporary unilateral internal ophthalmoplegia may be caused by the introduction of a mydriatic into the eye. Again, local trauma is sometimes a cause. Further, in a case of recovering third nerve palsy, dilatation of the pupil and defective accommodation may persist after the external ocular muscles have regained their function. With these rare exceptions, however, a persisting unilateral internal ophthalmoplegia is probably almost always an indication of previous syphilis. It is interesting to note that the mydriasis may be in excess of the cycloplegia, and that even when due to syphilis the ophthalmoplegia may be recovered from.

4. Unilateral internal ophthalmoplegia has in the great majority of cases very much the same significance as the Argyll-Robertson pupil, indicating not only previous syphilitic infection, but further, that the nervous system has been subsequently involved.

5. In every case in which the sign is met with, careful enquiry and search should be made for other signs of tabes, general paralysis, or cerebro-spinal syphilis, the detection of which will confirm its almost certain syphilitic origin.

6. A considerable proportion of cases in which this sign is the only indication of an affection of the nervous system subsequently develop further symptoms of the above-mentioned diseases.

7. The detection of a unilateral internal ophthalmoplegia in the absence of further signs or symptoms of nervous disease raises an interesting point in connection with life insurance.

8. It is well to bear in mind in connection with medico-legal compensation cases that it is possible to artificially produce a unilateral internal ophthalmoplegia.

Clinical Record

A CASE OF ALOPECIA AREATA NEUROTICA

By DAVID M. GREIG, C.M., F.R.C.S.,
Dundee

APART from those cases of alopecia areata in which the hair comes out in patches, with or without any inflammatory appearances in the skin, in which the baldness is temporary or even permanent, and in many of which there may be a possibility or a likelihood of some previous parasitic affection, there are cases like the subscribed where the temporary baldness recurs at intervals during years with accompanying evidences of a nervous disturbance which cannot be ignored nor dissociated from the local appearances. Indeed, it might be more accurate to call the condition one of nervous disturbance in which as a symptom the alopecia appears. To emphasise the prominence of the nerve element this has been called alopecia areata *neurotica*, but it is seldom that the relationship between the neurosis and the baldness is more marked and striking than in the following case.

The subject of the affection is 49 years of age, and employed as a coachman. He leads a healthy out-of-door life, though when working in livery stables he often has irregularities, both as regards hours and diet; but he maintains that he is a sober man and that he never exceeds, though I have reason to believe that this statement is at variance with fact on very rare occasions. He is a well-developed and healthy-looking, if somewhat spare man. His face is weather stained and freckled. Two-thirds of the right helix are replaced by scar tissue, and both ears show marks of old ulceration along the margins of their pinnæ, and the helices are less prominent than usual. He does not remember any sores to account for this, but at times he has picked little crusts from the edges of his ears after prolonged exposure to inclement weather.

His family history is remarkable for the neurosis it contains. He is one of a family of thirteen, of whom eleven grew to adult life. His father died æt. seventy-three, and his mother lived to nearly eighty years of age. One sister died in child-bed, possibly from puerperal fever. One brother died of "gravel in the bladder." One brother died insane, and another of "something in the head," while a sister died æt. thirty-six of some cerebral affection of short duration. He has at present a brother confined in a lunatic asylum, and one of his daughters has had at least one attack of chronic mania.

As a child he used to walk in his sleep, but this ceased with the approach of puberty. At the age of thirty-six he had an attack of

" shingles " on the right abdomen and thigh, and ten years ago had a similar attack on the back of the head, which roughly corresponded with the distribution of the small occipital nerve. Soon after that, too, he developed slight eczema rimosum on the palms.

The first time he had alopecia was when he was nineteen years of age, when the hair came out from one whisker. Since then it has come out on successive occasions from all possible parts of the hairy scalp and face, sometimes in one patch, sometimes in several, the patches varying as much in size and shape as in position. He has had no other illnesses.

Each attack of alopecia is ushered in by local and general premonitory symptoms. These are never entirely absent, and the more severe they are, the more marked is the subsequent baldness. The local symptoms are a dryness in the hairs, which tend to stand straight out from the scalp, and an alteration in their colour from a light brown to a grey.

The general symptoms are more marked and far-reaching. The most constant prodroma is itchiness. Sometimes this is local and limited to the site where the hairs are to come out. At other times it exists all over the body, but is liable to be specially pronounced in the lower limbs and in the trunk below the umbilicus. His nose gets red at the extremity and rarely there is a little indigestion and loss of appetite. The bladder becomes irritable and he has to pass urine oftener than usual, and when the desire to micturate comes on it is very imperious. Sometimes there is actual pain in the scalp, and on one occasion to such an extent in the eyebrows that he was unable to wear his coachman's hat. With the first symptoms of irritation he develops somnambulism. He finds that he rises at exactly the same time every night. This as a rule is midnight, but has been occasionally at 1 A.M., and during one attack was as late as 2 A.M. While it lasts he is always up once during the night and often four or five times, and on occasions he has risen every hour. This never interferes with his fitness for his work next day. Sometimes he walks out of the house before he wakes, but as a rule he becomes conscious to find himself standing in his bedroom. At such times he is dreaming about something exciting, generally fire. At one time he developed a swelling of the knuckles of the middle and ring fingers and on the dorsum of his right hand which lasted for three weeks. This looked like an osteo-arthritis, but completely disappeared again. Preceding its appearance he had a most troublesome itchiness in the shoulders and a feeling as if they were swollen, and then as the knuckles swelled these symptoms disappeared only to reappear as the condition of the knuckles improved.

On one occasion when the premonitory symptoms were in the ascendant, and his nose was red as usual, he accidentally scratched

it with his finger-nail. It bled more than he would have expected from such a slight injury, but he thought he felt better after it. Some months later he had slight epistaxis from the left nostril, and a little blood came every time he blew his nose. Though so slight he thought it relieved him, and he said that his " head felt emptier, fine and free and quite different like." Taking my cue from this I cupped him in the nape of the neck, and he derived so much benefit from this that he returned many times and demanded repetition. The quantity of blood removed varied from two drams to two ounces at a time.

He was used to blister the scalp himself when the itch became troublesome, using the usual liquor cantharidis, and if this were not sufficient to relieve the irritation he would rub in a strong ointment of chrysarobin. This treatment invariably gave him relief. Drugs were of little use. Strychnine increased the irritability and brought pains to the parts which had been affected with shingles years previously. Some relief was effected as far as his somnambulism was concerned by the administration of bromide of ammonium and iodide of potass.

Except the dry glistening appearance the skin never showed any alteration and there was never any signs of inflammation. The hair appeared to be perfectly restored, though after a very variable time.

Meetings of Societies

Edinburgh Medico-Chirurgical Society

THE first meeting of the Session was held on November 7—Dr J. O. Affleck, President, in the chair.

Dr Allan Jamieson showed microscopic specimens of Darier's disease, and Drs Bruce and Harvey Pirie gave a microscopic demonstration of the intermedio-lateral tract of the spinal cord.

Dr T. W. Dewar showed a case of lupus of 13 years' duration, which had been treated in a great variety of ways, including a prolonged course of Finsen light. Injection of tuberculin gave rise to a violent reaction. Complete cure resulted after 40 days' treatment by intravenous injections of an ethereal solution of iodoform.

Dr Allan Jamieson showed a patient suffering from Darier's disease.

Dr Byrom Bramwell showed a case of disseminated sclerosis resembling tabes. The ataxic gait was probably due to a large patch of sclerosis low down in the cord.

Dr George Mackay showed two cases of hereditary optic atrophy

in which the family history of the disease could be traced through several generations.

Dr Edwin Bramwell showed a case of general paralysis in a boy, aged 16. There was no suggestion of syphilis in the family or personal history of the case, but the cerebro-spinal fluid showed a marked lymphocytosis.

Mr Stiles showed a case of multiple neuro-fibromata. One of the tumours in the region of the buttock had been removed on account of its large size.

Mr Stiles also gave a few notes regarding a patient he had intended to show, but who had taken scarlet fever. The case had been sent to hospital as one of perforated appendicitis. It was found to be one of perforated typhoid ulcer with diffuse peritonitis. A portion of bowel was resected and a Paul's tube introduced. The artificial anus was closed at a subsequent operation.

Mr Stiles also showed a case of left facial paralysis following fracture of the base. He proposed to anastomose the spinal accessory with the facial nerve.

Dr T. D. Luke exhibited a new chloroform regulating inhaler (Harvey Hilliard's) for which he claimed many advantages.

Mr Alexis Thomson exhibited Roosevelt's clamp for gastro-intestinal anastomosis and demonstrated its uses on a model of the stomach and intestine.

Drs Alexander Bruce and J. H. Harvey Pirie gave a paper entitled " A plea for the study of the intermedio-lateral tract of the spinal cord." The paper was illustrated by a lantern and microscopic demonstration.

It was shown that the cells of the tract were most numerous where sympathetic fibres come off in greatest number.

There had been definite lesions of the cells of the tract in a case of acute poliomyelitis in an adult which affected the lower part of the body and was accompanied by loss of sweating in the lower extremities.

Alterations in the cells, hyaline changes in the vessels, and hæmorrhages had been found in the tract in two cases of exophthalmic goitre. It was suggested that the spinal sympathetic centres might be diseased in many conditions often regarded as functional.

Dr Byrom Bramwell in discussing the case thought it had been proved that the intermedio-lateral tract was connected with the sympathetic system. The fact that a lesion had been found in two cases in which *a priori* a lesion might have been expected seemed more than coincidence. Sweat affections seemed to be rare in anterior poliomyelitis, but might sometimes be overlooked. On the other hand, the lesion was probably frequently below the level of the intermedio-lateral tract.

Professor Cunningham said that the beauty of Drs Bruce and Pirie's work from the anatomical side was very striking. Lockhart Clarke, in 1851, had given a very fair, if not an entirely correct account of the tract, but unless the work of the anatomist were taken up by the clinician and physiologist, it was apt to fade in value even in the eyes of its author. He had no doubt that the intermedio-lateral tract was a sympathetic tract within the cord.

Edinburgh Obstetrical Society

THE first meeting of the 68th Session was held in the Hall, 5 St Andrew Square, on Wednesday, 14th November, at 8 P.M.—the President, Dr J. W. Ballantyne, in the chair.

The Treasurer made his Annual Statement to the Society. The President asked the Fellows to award Dr Craig a hearty vote of thanks for his successful management of the Society's finances. The Society then proceeded to the election of Office-bearers for the session. Sixteen new Fellows were elected.

The President then presented to the Society his Inaugural Address. He took for his subject the advanced condition of obstetrics in the centenary year of the Society, viz. 1940, and proceeded to draw a contrast between the present and that possible future. While many points were touched on in the address, two were considered with some detail, viz. Teaching and the condition of the Birth-rate.

In regard to teaching, the President ventured to predict that the feature of the new era would be the increase in the practical and personal instruction given to students, the systematic lectures being very largely replaced by references to systematic text-books. Further, he was of opinion that the next generation of teachers would have the aid of many extended applications of such instruments as the cinematograph and gramophone.

In regard to the wider and more social aspect of obstetrics, the President held that an obstetrician of 1940 would have much to tell as to what had been done in the epoch between 1906 and 1940 to check the falling birth-rate.

Dr Ballantyne cited statistics to show the very real gravity of the progressively diminishing birth-rate, as found in the most recent official returns. He pointed out, however, that this is a question which cannot receive adequate treatment at the hands of either the obstetrician or physician, as such, since the cause is not to be found in the field of medicine proper, but is to be sought rather in the complex and artificial state of society which has not only brought about an era of late marriages, but which also regards large

families as quite incompatible with the degree of personal luxury regarded as essential.

While the obstetrician can do but little to modify the ill effects of this social complexity upon the declining birth-rate, he could, the President held, do much to arrest the decline by directing more early attention to the care of the pregnant woman than he at present does. If the pathology of pregnancy received the attention which its importance ought to command, much might be done to arrest the enormous wastage of fœtal life due to abortion and still-birth. Further, proper treatment of a woman during the whole course of her pregnancy would do much to reduce the number of premature births and would thus reduce infantile mortality. There can be little doubt that the excessive death-rate among infants under a year old is swelled to a very appreciable extent by the deaths of premature children who, though born alive, have such poor vitality that they are unable to carry on for long a post-natal existence begun before they had the necessary strength to maintain it. Along such lines, the President held, the obstetrician must advance his art if, as a citizen of the Empire, he is to do his share in fighting the momentous question of " race suicide."

On the motion of Dr James Ritchie, seconded by Dr Craig, the Society offered the President a unanimous vote of thanks for his address.

Dr Lackie then read to the Society his communication on " The management of some Occipito-Posterior Cases." Dr Lackie gave notes on three difficult persistent occipito-posterior cases. In the first, forceps had ultimately been successful, though the instrument had slipped several times. In the other two cases internal rotation was performed, the hand being passed far enough in to grasp and rotate the shoulders. In both cases after rotation of the occiput to the front, delivery with forceps was remarkably easy.

Drs Barbour, Ritchie, Church, Dewar and others made remarks on the paper and Dr Lackie replied.

Glasgow Medico-Chirurgical Society

THE second ordinary meeting was held on October 19—the President, Dr Lindsay Steven, in the chair. There was a good attendance.

1. Dr Galbraith Connal showed and commented on the following cases: (1) A case of sphenoidal sinusitis in a man. The patient, 36 years of age, complained of blocking of the nose and discharge of long standing. He suffered a good deal from headache, felt mainly in the ear and forehead, and this became worse if the discharge was arrested. It was the right side which was affected. The middle turbinate was hypertrophied, and covered with a crust,

which was removed and the front wall of the sinus opened. Pus was obtained, and some necrosed bone curetted. The chief difficulty lay in keeping the sinus open. (2) A case operated on for combined empyemata of the maxillary antrum, frontal, ethmoidal, and sphenoidal sinuses. This multiple condition he considered not infrequent where infection was by the nose. (3) A patient from whose nostril a large sarcomatous tumour was removed three years ago, with no recurrence. It originated from the posterior end of the left turbinal. This patient was exhibited before this Society in May 1903. (4) A patient on whom he had performed the radical mastoid operation for purulent otitis media; when first seen this case had a primary diphtheria of the external auditory meatus. Perforation of the left drum occurred, and even after the diphtheria was cured the temperature kept up. After operation it returned to normal. (5) Dr Connal also read a short note on a case of purulent otitis media, with extra-dural abscess and septic sinus thrombosis. The otitis was bilateral, being chronic on the right, acute on the left side. On account of acute symptoms (rigors, fever, severe pain, vomiting) the radical operation was done on the left side, and subsequently the sigmoid sinus was opened and a clot cleared out. The patient sank, however, from pleuro-pneumonia, and, post-mortem, multiple abscess were found in the lungs.

2. Dr Alex. M'Lennan read a paper on spirochœtes of syphilis, yaws, and granuloma pudendi, and referred to the protoplasmic bodies found in syphilis. He pointed out that the serum of a syphilitic had been found to have a slight agglutinating power on the S. pallida, and to be able to lessen the activity of the organism. In congenital cases the spirochœtes could be found, generally in deeper structures, but occasionally actually on the skin. He had in a previous paper dealt with the protoplasmic bodies found in such cases, and which in some instances were flagellated. He believed them to be protozoal, and to have a relationship to the life-cycle of the spirochœte. Finally he spoke of the spirochœtes found in yaws, which were almost identical with those of syphilis, as pointed out by Castellani. The spirochœtes of granuloma pudendi was much more delicate, with closer spirals, and were difficult to stain.

THE third ordinary meeting was held on November 2—the President, Dr Lindsay Steven, in the chair. There was a good attendance.

1. Dr W. K. Hunter showed a man with complete anchylosis of the vertebral column, and Dr Riddell exhibited skiagrams from the case. Some 200 cases of this kind had been already put on record, the lesion here being in all probability of the nature of a rheumatoid arthritis. Dr Hunter also exhibited a case of infantile hemiplegia with athetosis.

2. Mr A. G. Faulds showed, and read a short note on, "Some curious bodies found in the Female Bladder." Many of these cases had come under observation owing to complaints regarding bladder function, but the foreign body had frequently caused no annoyance though present for a long time. Among other things Mr Faulds exhibited a wedding ring, a needle, a copper nail, a small bell (such as is tied round a cat's neck), and various other oddities.

3. Dr W. W. Christie showed, and read notes on, a case of periodontal cyst, operated on by Dr Walker Downie. The cyst did not differ in any special way from other cysts of this kind.

4. Dr J. G. Tomkinson read a short paper on "Ringworm and its present Treatment," and showed a number of illustrative cultures. The classification of the parasites adopted, was mainly that of Sabouraud's, and Dr Tomkinson in regard to treatment laid stress on the benefit of X-rays.

THE fourth ordinary meeting was held on November 16—the President, Dr Lindsay Steven, in the chair. There was a good turn-out of members.

1. Dr T. K. Monro and Dr A. N. M'Gregor showed two cases of œsophageal stricture treated by gastrostomy on the Kader plan. The first case was a man of 70, who had suffered from dysphagia since January last. The stricture was high up, and only liquids could get through. The second case was that of a girl of 21, who had swallowed ammonia. Two cicatricial contractions occurred, one being practically complete. Both cases were transferred from Dr Monro's wards to Mr M'Gregor's care, and in each case the Kader operation was successfully performed and has given good results. Thereafter Dr Macintyre made attempts at dilation in the girl's case, with some success.

Drs Downie and Inglis-Pollock, Mr Maylard, and the President commented on these cases and Mr M'Gregor replied.

2. Dr Geo. H. Edington described two cases of intestinal obstruction due to a "band" connected with a tuberculous gland. The first case was that of a boy of 15, taken suddenly ill. The abdomen was opened by a cut along the right rectus muscle and a band was found running across the ascending colon, one end being attached to a large fluctuant tuberculous gland, the other somewhere in the iliac fossa. The band was divided and the gland (which was just on the point of rupturing) removed. The second case was that of a boy of 10 years who had been ill 6 days. In the abdomen there were numerous caseating tuberculous glands, and adhesions passing across the ileum. These were freed, but the patient unfortunately did not recover.

Dr Edington also showed a tuberculous hernial sac, and gave a short account of a case of tuberculosis of the tunica vaginalis.

3. Dr R. M. Buchanan (bacteriologist to the Corporation of Glasgow) read a short paper on "The Carriage of Infection by Flies," and gave a lantern demonstration. The flies used were the common house-fly and blue-bottle-fly, and the skin-beetle, very common in skin-factories. The usual plan was adopted, which was to expose the flies to infected material and then allow them to walk over nutrient material in Petri plates.

(*a*) Flies captured in enteric wards yielded no bacillus typhosus, but gave coliform organisms.

(*b*) Flies allowed to walk over typhoid dejecta yielded B. typhosus.

(*c*) Flies taken from a carcase of a pig dead from swine-fever, on which they were feeding, gave back the specific organism.

(*d*) Flies from the carcase of a guinea-pig dead of anthrax, produced a copious growth of B. anthracis.

(*e*) Flies allowed to walk on ordinary pus yielded staphylococci.

(*f*) Flies allowed to touch tuberculous sputum yielded a wash from the surface of the plates which, inoculated into a guinea-pig, caused typical tuberculosis.

Glasgow Pathological and Clinical Society

THE second ordinary meeting was held on November 12—the President, Dr Lindsay Steven, occupied the chair. There was a good attendance. Before the ordinary business began, the President paid a fitting tribute to the memory of Dr Jas. Finlayson, one of the original and most devoted Fellows of the Society.

1. Dr Ebenezer Duncan and Mr Maylard showed a man who had been operated on successfully for abscess of the lung. The patient, a man of 27, came under Dr Duncan's care at the Victoria Infirmary first in June of this year, complaining of cough, weakness, and offensive discharge from the lungs. He had been a sufferer from bronchiectasis, it was said, for some years, and had before this been in the Western Infirmary. When taken into hospital he was well nourished and had a cough with muco-purulent sputum of the most offensive character. This was most abundant in the morning. When the patient was inverted, pus flowed out of his mouth. The amount of pus lost daily varied from 15 to 32 drms. It contained pneumococci, but no tubercle bacilli. Anteriorly the chest seemed normal, save for a little flattening on the left side. Posteriorly there was an area of dulness in the lower interscapular region, which, after the patient had been inverted, revealed a central area of tympanicity with cavernous breathing. Antiseptic inhalations and the like proving

of no use, the case was sent in to Mr Maylard's wards in July for operation if possible. Mr Maylard found, after removing portions of the eighth and ninth ribs, that there was no adhesion between visceral and parietal pleuræ. He tried to create one by repeated scratching with needles, and at length (July 19) felt justified in pushing in a fine trocar. No pus escaped. On his return from holiday he kept the patient on his back for 60 hours, opened through the old cicatrix with only a local anæsthetic, and inserted a larger trocar. Pus trickled out, and when the patient coughed a free discharge took place. The wound was enlarged, and the finger could be passed into a large smooth-walled cavity of the dimensions of an orange. A large tube was put in and drainage carried on for some weeks. The wound is now well healed, the fœtid discharge has ceased, and the patient looks well. There is still slight bronchorrhœa.

The case was discussed by Drs Carslaw, Rutherford, and Buchanan, and Mr Maylard replied.

2. Miss A. Louise M'Ilroy (introduced by Dr J. K. Kelly) gave a lantern demonstration on primary carcinoma of the ovary. She had had the opportunity of studying the histological details of 15 cases, which made the basis of this communication. It was a disease of middle life—near or at the menopause. It occurred often as a painless process, the patient having a growth of considerable size without perhaps being aware of its existence. Ascites usually accompanied, and if the menopause had not occurred, menstruation tended to be checked. The growths might be classified broadly as cystic and solid, and in a single growth there might be more than one type of malignant tissue. Dr M'Ilroy showed a large number of beautiful slides, from sections of her own preparation, in illustration of her remarks.

Glasgow Southern Medical Society

THE third ordinary meeting was held on November 1—the President, Dr T. K. Monro, in the chair.

Dr W. F. Somerville read a paper on "The Influence of High Frequency Currents on the surface temperature of the human body." He had been struck by patients telling him that they felt warmer after a sitting, and he looked into the matter. He took readings from the surface at three minutes intervals for a quarter of an hour, then gave a sitting, and repeated the observation, and was convinced that the surface temperature rose about one degree. The paper was illustrated by lantern slides and the special electrodes and thermometer used were exhibited.

THE fourth ordinary meeting of the Society was held on November 15—the President, Dr T. K. Monro, in the chair.

Dr John Duncan opened a discussion on the "Treatment of Dyspepsia," and considered briefly the normal physiology of digestion in the light of the recent work of Pawlow and Starling. At the same time he indicated how derangements of function might arise, and how these gave rise in their turn to dyspepsia.

He was followed by Professor Stockman, who laid stress on the frequency with which catarrh accompanied dyspepsia, the thick, glairy mucus greatly interfering with digestion. Many persons periodically suffered from attacks of this kind, which often had simply to run their course; when it occurred in the bowel, part of the symptoms were due to toxæmia. In stomach cases most good was got from alkalies. He believed strongly in the use of general exercises for strengthening the abdominal muscles.

Dr Thos. Forrest said it was often difficult to say when acids were of value, and when alkalies. He believed geographical distribution had something to do with it, and that in the humid West of Scotland acids were not called for so much as in the East. He largely used lactated pepsin and elixir of pepsin, and was convinced of their good.

Dr Carstairs Douglas said a few words on the use of ferments as aids to feeble digestion. Ptyalin was rarely absent from saliva. If its action was poor, it was better to malt food first. He was convinced that good preparations of pepsin—acid glycerine and glycerules—were of real service. Hydrochloric acid if given in twenty minim doses was able to bring gastric contents up to the normal acidity and so aid pepsin. Pancreatic ferments he believed were rarely wanting, except in very gross disease of the organ.

Dr Miller spoke on the influence of the liver, Drs Paton and Forrester on the use of the stomach-tube, while the President in a few words brought the discussion to a close.

Glasgow Northern Medical Society

THE Society met on November 6, 1906, Dr T. A. C. Macewen in the chair. Dr John Donald showed a case of capillary nævus involving the entire side of the face and neck of a young woman. This had been treated with X-rays and the nævus had turned almost colourless in the areas exposed to the rays. There was no scarring of the skin. Dr Donald also showed a young woman who had had a copious growth of hair on the cheeks and chin. Under the X-rays the cheeks were now quite free of hair and have remained so for two years. The chin has not been treated.

Dr A. T. Ballantine showed a series of photographs illustrating the diagnosis of foreign bodies in the orbit by means of X-rays, and

remarked on the influence such photos had on prognosis and treatment.

Dr T. A. C. Macewen showed a sebaceous horn removed from the scalp of a woman.

Dr R. G. Inglis read notes of a case of acute inversion of the uterus coming on a few hours after labour and unaccompanied by shock or hæmorrhage, but causing severe labour-like pains. Restitution took place on very slight upward pressure.

Dr A. N. M'Lellan gave notes of two cases where spontaneous replacement of the retroverted gravid uterus had taken place.

Forfarshire Medical Association

THE opening meeting of the session was held in the Fleming Gymnasium, University College, Dundee, on Friday, October 12th, at 4 P.M., when Professor Marshall gave an address on "The Swedish System of Physical Culture and its Therapeutic Application." In his opening remarks he stated that in the teaching of general therapeutics there was no subject so exclusively ignored as exercise, the chief reason for this being the charlatanry which had for so long unfortunately enveloped it. Till within recent years in these islands an irrational system of exercise had prevailed, which resulted in supplying the circus and variety halls with trapeze performers. In most schools the gymnasium was too freely open, and the chief object appeared to have been to induce exhaustion by a limited series of exercises in the shortest possible time. He stated that the aims of physical culture were to produce a relatively uniform development of the muscular system, and to bring all muscular acts which were common to everyday life under the immediate control of the will, incidentally leading to a better carriage of the body, to grace of movement, and to a healthier life. Ordinary recreations did not fulfil these functions, as they developed one group of muscles more than another.

To supply this want a properly devised system of physical education was necessary. A system which, while being as recreative as possible, should have for its primary object the healthy development, not a pathological hypertrophy, of all the muscles of the body. The best was that of Ling, which was now known as the Swedish system. The advantages of that system were, that it was adapted to any age, to any place, to any degree of proficiency. It could be sufficiently varied to avoid monotony, and if properly taught required sustained mental effort. It could also be adapted to therapeutic purposes. The object of this system was to attain sensible control of the muscles and muscular co-ordination of the body and develop them along

rational lines, and incidentally to maintain or attain a healthy function of all the organs of the body.

Professor Marshall described the system in detail, and with the assistance of Mr Kimber (Director of Physical Training, University College) demonstrated various lessons and exercises. He showed how these might be applied as correctives in lordosis, kyphosis, flat-foot, and the value of such exercises in the treatment of abdominal conditions, constipation, cramps, paralyses, respiratory and heart affections was also pointed out.

Professor Marshall was thanked for his address and a general discussion on the value of the system from a therapeutic point of view followed.

THE second meeting of the session was held in the School of Medicine, Dundee, on Thursday, November 8th, at 8.30 P.M. Mr Greig, Vice-President, occupied the chair.

Dr Pirie gave a demonstration of some recent X-rays photographs. These included normal joints which were compared with those showing rheumatic and gouty arthritis in hands, knee, and feet. Lungs normal and those showing tuberculosis early and advanced. One or two cases of fracture before and after treatment, and a photograph of epithelioma of the tongue. Mr Greig read notes of a case which is reported fully on p. 541.

Dr Halley then read a paper on "The Surgical Out-patient Room," beginning with a few general remarks on the necessity for such a department in connection with a hospital, giving from his experience the reasons why patients came for treatment. The difficulty in the treatment of cases on account of irregular attendances was dealt with. The total numbers of the patients who visited the Infirmary out-patient room during the last three years were given, and the numbers who attended on Dr Halley's days. He stated that the largest group of these were accident cases, and the nature of the most numerous of these mentioned. Fractures occupied a foremost place, and the nature of these was detailed. Special reference was made to the treatment of fractures of the upper extremity, and emphasis laid on early massage and early passive movement of the adjacent joints. Early examination of the parts injured, after having been first treated, in order to correct any commencing deformity was advocated.

The next in order of numbers were cases of skin disease. Of these, cases of eczema were the most numerous. Seborrhœa and dermatitis of the scalp in children, impetigo, scabies, favus, and ringworm followed. The difficulties in treatment of cases affecting the scalp were mentioned, chief of these being refusal to have the hair cut.

The third group of cases was composed of septic cases which came up after having had other treatment which concealed the original cause of the trouble. There were abcesses, septic adenitis, ulcers of the leg, furunculi and cellulitis. The treatment of the various forms of ulcer of the leg was discussed, and the advantage to be gained by the use of the elastic bandage was strongly advocated. Other affections such as joint disease, hernia, and various tubercular conditions were detailed, and points in the treatment of the same mentioned in varying degree.

A general discussion on the points of interest in the paper followed.

Births and Deaths registered in Eight of the Principal Towns of Scotland during October 1906

DURING the month of October 1906 there were registered in the towns of Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Leith, Greenock, and Perth, the births of 4239 living children, of whom 2180 were males and 2059 females. These births are 580 more than those registered in September, and 207 more than those registered in October of last year. These births are equivalent to an annual birth-rate of 27.9 per thousand of the estimated population of these eight towns, a rate which is 3.0 more than that of September and 0.8 more than that of October of last year. The birth-rate for the month ranged from 32.3 in Greenock to 19.4 in Perth. In Leith it was 31.6; in Aberdeen, 29.6; in Glasgow, 29.4; in Dundee, 27.2; in Paisley, 25.8; and in Edinburgh, 23.5.

Of the 4239 children born, 322, or 7.6 per cent., were illegitimate. The rate of illegitimacy was highest in Dundee, 9.4, and lowest in Perth, 3.5. In Edinburgh it was 8.7; in Aberdeen, 8.4; in Glasgow, 7.6; in Paisley, 6.8; in Greenock, 4.6; and in Leith, 4.1.

Deaths registered in these towns during the month numbered 2612, of which 1311 were of males and 1301 of females. These deaths are 341 more than those registered in September and 128 more than those registered in October of last year. The equivalent annual death-rate for the month was 17.2, a rate which is 1.7 higher than that for September, and 0.5 higher than that for October of last year. The death-rate for the month ranged from 18.9 in Dundee, and 18.5 in Glasgow, to 12.8 in Leith. In Greenock it was 17.5; in Paisley, 17.0; in Edinburgh, 15.7; in Perth, 15.0; and in Aberdeen, 14.7. In Leith the death-rate was lower than in September; in the remaining seven towns it was higher than in that month.

Of the 2612 deaths, 933, or 35.7 per cent., were of children of less than five years old; while 673, or 25.8 per cent., were of persons of

over sixty. The former are 37 more than in September, and 102 more than in October of last year; the latter are 162 more than in September, and 18 more than in October of last year.

Deaths of infants of less than one year old numbered 631, being 25 more than in September, and 104 more than in October of last year. These deaths are equivalent to an infantile mortality-rate of 151 per thousand births, a rate which is 1 higher than in September, and 26 higher than in October of last year. The infantile mortality-rate was highest in Dundee, 169; and lowest in Perth, 86; In Glasgow it was 160; in Edinburgh, 149; in Greenock, 148; in Paisley, 144; in Aberdeen, 135; and in Leith, 92. In Leith, Greenock, and Perth this rate was lower than in September; in the remaining five towns it was higher than in that month.

Deaths from the principal epidemic diseases numbered 268, which is equivalent to an annual death-rate from these causes of 1.8 per thousand. These deaths are 55 fewer than in September, but 60 more than in October of last year. This rate is 0.4 lower than in September, but 0.4 higher than in October of last year.

No deaths from smallpox were registered in these towns during the month. Deaths from measles numbered 18, which is 7 more than in September, but is 45 fewer than in October of last year. Deaths from scarlet fever numbered 15, and were 3 more than in September, and 5 more than in October of last year. Deaths from hooping-cough numbered 52, and were 11 more than in September, and 17 more than in October of last year. Deaths from diphtheria numbered 32, which is 14 more than in September, and 4 more than in October of last year. Deaths ascribed to fevers numbered 37: of them, 20 being due to enteric fever, and 17 to cerebro-spinal meningitis; of the latter, 15 were in Glasgow, 1 in Edinburgh, and 1 in Paisley.

Deaths from diarrhœas numbered 114, and were 93 fewer than in September, but 60 more than in October of last year.

Deaths ascribed to influenza numbered 11; puerperal septic conditions, 16; to malignant disease, 169, of which 77 were ascribed to carcinoma, 9 to sarcoma, and 83 to cancer not otherwise defined. Deaths from heart disease numbered 240; from apoplexies, 124; from premature birth debility, 85; and from alcoholism, 12.

Deaths from pneumonia numbered 263, or 10.1 per cent. of the total, while those from bronchitis numbered 151, or 5.8 per cent. of the total. The former are 110 more than in September, and 15 more than in October of last year; the latter are 70 more than in September, but 24 fewer than in October of last year.

Deaths from tuberculous diseases numbered 325, and are 39 more than in September, and 15 more than in October of last year. These deaths from tuberculous disease constituted 12.4 per cent. of the total deaths of the month; 193 of them were ascribed to phthisis.

To violent causes 113 deaths were due; of them, 8 were ascribed to suicide, 2 being by hanging, 2 by poison, and 1 each by cutting, by gunshot, on a railway, and by a means not specified.

The deaths are recorded of 2 men and 10 women who were aged 90 years and upwards; the oldest of these were two widows, both aged 94.

Editorial Notes and News

Faculty of Physicians and Surgeons of Glasgow.

THE annual business meeting of the Faculty was held on November 5, when the statements of the Treasurer, Honorary Librarian, and others were submitted. Dr W. L. Reid was re-elected to the Presidential chair for a further period of twelve months; Dr John Glaister was elected Visitor; and Dr W. G. Dun, Honorary Treasurer.

Appointment to the Western Infirmary, Glasgow.

On November 13 the Managers of the Western Infirmary appointed Dr Lindsay Steven as Visiting Physician in place of the late Dr Finlayson. Dr Steven is at present a Physician to the Royal Infirmary (a position which he has held for some time), Honorary Librarian to the Faculty of Physicians and Surgeons, and President of both the Medico-Chirurgical and Pathological and Clinical Societies of Glasgow.

Royal Infirmary, Edinburgh.

THE Managers have made a second charge in the Ear and Throat Department, and have appointed Dr Malcolm Farquharson surgeon, and Dr J. D. Lithgow assistant surgeon to the department.

Sir A. R. Simpson

IT is quite characteristic of Sir Alexander Simpson that he has declined any personal testimonial on his retirement, and has indicated his approval of a proposal to devote any available funds to the endowment of a bed in the Maternity Hospital.

Sir Alexander is now on his way to the East, and it is hoped that the whole matter will be complete on his return.

Royal College of Physicians of Edinburgh

A QUARTERLY meeting of the Royal College of Physicians of Edinburgh was held on Tuesday, November 6, 1906—Dr Playfair, President, in the chair.

Robert Cranston Low, M.B., Ch.B., was introduced and took his seat as a Fellow of the College.

Robert Brooks Popham, M.R.C.P.E., F.L.S., West Ealing, was admitted by ballot to the Fellowship of the College.

On a ballot the following candidates were admitted to the Membership of the College after examination:—William Herbert Fawcett, L.R.C.P.E., F.R.C.S.E., D.P.H., Bournemouth; Robert Durward Clarkson, M.D., C.M., B.Sc., Falkirk; Robert William Johnstone, M.B., Ch.B., Edinburgh; Hugh Angus Stewart, M.B., Ch.B., Pitlochry.

The Registrar reported that since the last quarterly meeting of the College, forty-nine persons had obtained the licence of the College by examination.

Dr Alexander Goodall, F.R.C.P.E., was recognised as a lecturer on Physiology.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow

THE Quarterly Examinations of the above Board, held in Edinburgh, were concluded on 31st October, with the following results:—

First Examination, Five Years' Course.—Of twenty-eight candidates entered, the following eight passed the examination:—Bhairawnath Dinanath Khote, Bombay; Robert Eric Noel Martyn Clark, Punjab; Andrew Dawson Turnbull, Edinburgh; William James Moore, Dunoon; Alexander Ritchie Taylor, Fraserburgh; John Adami, Malta; William James Hogg, Birmingham; and Harry Russell Macnab, Downpatrick, and one passed in Physics, four in Biology, and one in Chemistry.

Second Examination, Four Years' Course.—Of two candidates entered, the following one passed the examination:—George Vernon Edwardes, Cheshire.

Second Examination, Five Years' Course.—Of twenty-six candidates entered, the following thirteen passed the examination:—George Francis Hegarty, Cork; Cornelius O'Herlihy, Cork; James Thomas Gwynne Jones, Wales; Zerk Daniel Lotter-Luther, Cape Colony: Charles William Gee, Wigan; Sydney Granville Tibbles, Nottingham; Reginald Andrew Hosegood, Swinton; George Fitz-William Forde, Ballygeany; Evan Aynsley Klein, British Guiana; Denis Michael O'Sullivan, Ireland; William Clare Leonard Malone, Australia; Karl Frederick Percy Richard Gover, British Guiana; and George

Noel Braham, Bath, and one passed in Anatomy, and one in Physiology.

Third Examination, Five Years' Course.—Of twenty-nine candidates entered, the following twelve passed the examination :—Eduljee Perozshaw Meherjee, Bombay; Maria Shepherd Allen, Cheadle; Augustus Jourdain Kelsey, Mauritius; Zerk Daniel Lotter-Luther, Cape Colony; Alexander M'Murray, Belfast; Hugh Clement de Souza, Rangoon; William Henderson, Scotland; Joseph Louis Pinto, Portuguese India; Frank Humphrey Kiddle, India; Andrew Downie Macfie, Scotland; Edward Lewis, Anglesey; and Francis Wardlaw Milne, Helensburgh; and three passed in Pathology, and two in Materia Medica.

Final Examination.—Of eighty-two candidates entered, the following thirty passed the examination, and were admitted L.R.C.P., L.R.C.S.E., and L.F.P. and S.G. :—Walter Bingham Kendall, Canada; Neil M'Leod, Edinburgh; Charles Edward Preston, Canada; Lionel Langford Westrope, Shrewsbury; John Henry Morris Jones, N. Wales; Henry James Gorrie, Dundee; Merwanji Dinshah Printer, Bombay: Zilla Edith Da Costa, India; Henry Fleet Gordon, Canada; Dhunbai Maneckji Cama, India; Harold Lyons Hunt, Canada; Harry Ferguson Shepherd, Lisburn; Henry Ruddock Morehead, Co. Cork; John Clarke, Ballymena; Satya Charan Pal, Bengal; Emma Irwin, New Zealand; Thomas Mayne Reid Waddell, Tokio; Walter Hugh Peerless, Victoria; Tandalam Madhava Row, Kumbakonum; Lizzie Lyford de la Harpe, Ceylon; Percy Bateman, Cork; Robert Thomas Aloysius Patchett, Lancashire; Eduljie Perozshaw Meherjie, Bombay; David Graham Barkley, Edinburgh; Capel Geary Dyer, Hampshire; Richard Baring Davidson, Congleton; Munchersha Byramji Irani, Bombay; James Augustus Robertson, British Guiana; Arthur Donald Roberts, India; and John Henry Peter Wijesinghe, Ceylon; and sixteen passed in Medicine and Therapeutics, three in Surgery and Surgical Anatomy, seventeen in Midwifery, and thirteen in Medical Jurisprudence.

Recent Literature

CRITICAL SUMMARIES AND ABSTRACTS

MEDICAL JURISPRUDENCE

By CARSTAIRS DOUGLAS, M.D., D.Sc., F.R.S.E.,
Professor of Medical Jurisprudence and Hygiene, Anderson's College, Glasgow

Seven Cases of Poisoning by Coal-Gas occurring simultaneously.—In the August number of *Les Annales d'Hygiene Publique et de Médecine Légale*, Visbecq gives an account of seven cases of poisoning by illuminating gas occurring simultaneously among soldiers, the occupants of a military hospital. An attendant coming to the room in the early morning found all the inmates prostrated—some stretched on their beds, others lying on the floor. Medical aid was obtained at once, as the strong odour of coal-gas aroused the suspicion at once of gas-poisoning.

The first case was a slight one. The man had awakened in the early morning, and had risen to call the hospital orderly. He perceived a smell resembling that of coal-tar, trembled and felt pain in his head, and lay down on his bed again. He fell asleep, and woke with a sensation of cold. When found in the morning he was seated on his bed; the pupils were dilated and there was a slight froth on his lips. He was dull and heavy; he said afterwards that he had felt a desire to explain to the doctor what had occurred, but could not speak. His headache grew worse in the course of the morning, the pupils remained dilated and the face was slightly red.

The second case (a severe one) had not been able to fall asleep quickly on the preceding evening, but he had no recollection of what transpired after. He was found in a state of complete lethargy, stretched on his bed, with a pale face and an abundant froth over the lips. The respirations were bad, and the pulse rapid. Under the influence of treatment and aeration the breathing improved, tending, however, to grow worse again when the supply of oxygen was withdrawn. At 9 A.M. on the morning of the accident he began to open his eyes, and a little later to recognise those about him. At 2.30 P.M. his pulse was 93, the face was slightly rosy, and he had severe headache, chiefly supra-orbital. The patient could pass no urine, so the catheter was passed. The urine gave a slight cloud on boiling, dispersed by nitric acid. When more of the acid was added a pink tint appeared. The treatment adopted

was oxygen inhalation, at first continuous, and then at intervals; artificial respiration, rhythmical traction on the tongue, injection of ether and caffeine, flagellation of the face, and the administration of warm milk as soon as the man could swallow. In this case the bulbar phenomena were those which were most marked, especially as regarding respiration, which tended to cease when the artificial movements were stopped.

The third case was also severe. The victim was found stretched on his bed in deep unconsciousness, with rapid pulse, dilated pupils, and enfeebled breathing. When roused much he took convulsive attacks, relapsing speedily into a state of torpor. For a long time he resisted treatment, and showed a special tendency to relapse when the oxygen inhalations were withheld. The pupils remained dilated for some time, the headache was severe, and the face was moderately red, while the lips were distinctly so. The urine gave a cloudiness on heating, plus the addition of nitric acid, and the precipitate acquired a dirty pink tint. The blood taken from the ear on the evening after the accident gave no spectroscopic indications of carbon monoxide. The accident took place in the early morning of January 28, and the patient was discharged on February 11. A noteworthy feature in his case was the onset of convulsions when he was disturbed.

Number four was a case of moderate gravity. He was found sitting on his bed in a state of hebetude, with dilated pupils and much headache. He had vomited during the night. He was not unconscious, but he passed a motion involuntarily in the morning. His face was red. He progressed satisfactorily. The urine was normal.

Case five was a light one. The patient had risen during the night, then fell three times, lay down and went to sleep again. He was found in the morning seated on his bed, a froth on his lips, dull and heavy, and unable to answer questions. There was headache and the face was pale. The urine contained no albumin, but gave a rose tint with nitric acid. He did well.

Case six, a light one, had had a broken sleep, and got out of bed at 4.30 A.M. on January 28. He felt sick and fell on the floor, losing consciousness of all that transpired thereafter. When found he was on his bed. He could not stand on his feet, and was dull and heavy, though he could answer questions slowly. The pupils were dilated. The urine gave a light rose tint with nitric acid. This man was nearly quite well by the evening of the same day, and did not need to be sent to hospital.

The seventh and last case was a severe one, and of interest in so far that the symptoms developed slowly. He was in charge of this small ward, and in the preceding evening after doing some

official writing felt slightly deaf. He did not sleep in the same ward as the patients, but had a troubled rest, and was aroused by an orderly who told him that the invalided soldiers in the adjoining room had been found unconscious. He rose and sent for the doctor, helped to remove the patients and to attend to them, and only after that did he suddenly complain of giddiness. He went to the window, and some ten minutes later lost consciousness. The breathing became feeble, the pupils were much dilated and the conjunctiva insensitive, while the face was flushed. He remained like this for an hour and a half, when he gradually got better, having no remembrance of what had befallen him. He was quite well in three days. As he was regaining consciousness he was much excited, speaking loudly and rapidly and throwing his arms about. He presented, too, some cardiac arythmia. This case is interesting as being a case of retarded toxic action.

Of these seven cases simultaneously affected, three were really serious. Identical phenomena were not present in all of them, but they all agreed in showing much hebetude and depression. It is, of course, well known, as proved by Layet and others, that the poisoning in coal-gas escapes is really due to carbon monoxide, which is present in the gas of Paris in amounts varying from 5 to 20 per cent. Most of these accidents take place in winter, and usually at night, as the odour of the gas is not perceived during sleep. In the case under consideration the gas had been escaping in small amount from the end of a T-joint, which, it was supposed, had been properly closed by the plumbers in some recent repairs.

Brouardel, in "Les Asphyxies," 1896, p. 119, divides poisoning by coal-gas into three groups:—

1. Those where a large quantity of gas is rapidly drawn into the bronchial tubes. This occurs in gasfitters working carelessly, and perhaps in some cases of suicide.

2. Those due to escape of gas into an apartment. Thanks to its odour, coal-gas in the proportion of 1 in 1000 can be detected. It is dangerous when there is 5 per cent. in the atmosphere.

3. Those instances where there is no smell of gas in the house, nor, perhaps, any gas even laid on in the house. These cases are important. They arise from the escape of gas at some distance, with subsequent filtering of the gas through the soil. Bruman, in his thesis entitled "Empoisonnements par le gaz d'éclairage," Paris, 1885, collected a number of instances of this kind. The accident generally arose from a leak in the gas-pipes in the sub-soil of the adjoining street, and in one instance travelled a distance of 35 metres.

As regards the diagnosis, the condition of the patient and the smell of the gas make one practically certain as to what is amiss. The spectroscope in severe and fatal cases usually reveals the presence of carbon monoxide hæmoglobin in the blood.

On Eaters and Smokers of Opium.—At the French Colonial Congress, held this summer in Paris, under the presidency of M. Delouch (Deputy from Cochin-China), Dr Jeanselme read a paper on the eating and smoking of opium in the Far East.

Eaters of opium take at first but a small dose, say from 0.15-0.3 grm.; but little by little they augment the daily dose, till they come to be able to take the huge quantity of 10 grm. at a time. Those who possess a little moral character may be able to restrain their daily ration to a few centigrammes and do not develop into opiomaniacs, but this is rare. Most commonly the man who begins to eat opium steadily increases the dose, and serious symptoms are not slow to make their appearance.

The massive consumers of opium lose their appetite, suffer from nausea, have occasional vomitings, and are troubled at first by constipation, to be succeeded at last by an intractable diarrhœa. If deprived of their poison they fall into a profound apathy; gradually their intellectual and affective faculties become perverted; they can think of nothing beyond the gratification of their passion. Opiophagy, as it is termed, has votaries in Britain and in the United States, especially, it is said, in Michigan.

Opium-Smokers.—In 1858 it was computed that there were 2,000,000 opium-smokers in China; 20 years later the number was reckoned at between 100,000,000 and 120,000,000; since then it has further increased. The vice is almost equally widely spread in Indo-China, as will be gathered from the fact that the French colony purchased, in 1900, not less than 110,000 kilos. of opium in India and in the Yun-Nan.

For each smoke, the opium-taker uses about one-quarter of a gramme of opium (roughly 4 grains), and an average smoker will get through from 30 to 60 pipes a day, which means a total of from 8 to 10 grammes of the drug. Tolerance, however, is rapidly acquired, and the smoker arrives more or less rapidly at the point when he will consume 100 or even 150 pipes in a single day.

If at the beginning of the habit the smoker experiences the most delightful sensations, this felicity does not last long. The smoker loses interest in everything (except his enslaving passion), as well as memory, judgment, and what little character he may

possess. The muscular force diminishes, the gait becomes hesitating, the pulse and respirations grow slow and irregular. The secretions lessen, the virile powers decline, and the victim sinks into a state of moroseness, in which some intercurrent complaint or an attack of severe diarrhœa puts an end to his misery. Europeans unfortunately not unfrequently contract this habit, and, returning to France, make many proselytes. These particularly frequent the naval stations, and form a real menace to the marine.

The result of this communication regarding the individual, the race, and society, lead to the following:—

That, considering the steady increase in the number of opium-smokers in the French colonies in the Far East, and the crippling effect this has on proper administration, and also considering the fact that as not a few military and civil officials have contracted the habit and carried it into other colonies, and even into France itself, where it threatens to spread, this Congress moves (1) that a very strict surveillance in regard to this matter be exercised over officials of all grades, both military and civil; (2) that those officials who have been convicted of habitual smoking be severely reprimanded, and in event of a relapse, sharply punished; (3) that in the metropolis every place for the smoking of opium, whether public or private, be closed; and (4) that all sellers and distributors of opium be prosecuted in accordance with the law of the country.

SURGERY

By HENRY WADE, F.R.C.S.,

Conservator, Royal College of Surgeons' Museum; Assistant Pathologist, Royal Infirmary, Edinburgh

CANCER OF THE RECTUM. THE REMOVAL OF HIGH-SEATED TUMOURS

PROBABLY the most interesting and instructive discussion which took place at the last meeting of the Deutschen Gesellschaft für Chirurgie was that introduced by Kraski of Frieburg, upon the further development of the operative treatment of high-seated cancer of the rectum.

The short paper with which he introduced the discussion on that occasion is reproduced *in extenso* in the *Archives für klinische Chirurgie* for September of this year.

It consisted mainly of a plea for the more widespread adoption of the combined method for the removal of the tumour by, firstly,

gaining access to the neoplasm from above by an incision through the abdominal parietes, and the subsequent removal of the portion of rectum containing the tumour from below, for preference through the sacral route.

As was naturally to be expected when one considers the gravity of such an operation this recommendation did not meet with anything like universal approval from the many eminent surgeons who took part in the subsequent discussion.

The facts brought forward in favour of its adoption, however, well merit the careful consideration which they received.

As Kraski remarks, the idea of combining laparotomy with one of the older and more usually adopted operations is not new. Thirty years ago it was proposed by Volkmann. It was not, however, until some years later that it was actually adopted. At first it was only in such cases as that where a surgeon had attempted to remove the tumour from below, but, owing to its situation and the adhesions that bound it down, he had failed to accomplish this object and was face to face with the prospect of having to abandon the operation, that laparotomy was performed and the combined method adopted under compulsion. Of late years, however, certain surgeons, such as Quénu in France, and Kraski in Germany, have adopted the combined method as a definite form of operative treatment for a certain class of case.

Undoubtedly they are right in claiming for this method that by it alone can the more severe cases of high-seated cancer of the rectum be removed. Only by this method also can one satisfactorily accomplish the ideal before one in all operations for the removal of cancer — the removal of the entire organ diseased with its lymph channel and lymphatic glands intact. At the same time the risk of metastatic infection from the manipulation of the tumour is by this means reduced.

Satisfactory results can only be obtained by the combined operation when it is done systematically. It should always begin with the laparotomy, which has the twofold advantage of diminishing the risk of septic infection of the abdominal cavity, and allowing of the extent of the disease being more correctly estimated before any extensive operation for its removal is carried out, and, should the extent and dissemination of the disease not merit the combined operation being performed, of relief being obtained by the establishment of an artificial anus by inguinal colostomy.

The patient being placed in the Trendelenburg position, Kraski recommends that a median incision is to be preferred in the majority of cases. The subsequent stages will depend on the nature of the operation to be performed. A process relatively frequently adopted, more especially in France, is that devised and recommended by Quénu. It consists of dividing the bowel above the tumour and

establishing a permanent artificial anus in the inguinal region. The tumour is then dissected out from the peritoneal cavity, and the whole rectum is now excised from the perineum. The advantages of this method, which was adopted as early as 1882 by König, and in France even before Quénu by Gaudier, are not to be disregarded. It has the advantage of greater simplicity and greater rapidity, as compared with those where the integrity of the channel is restored, and at the same time the removal of the area wide of disease is most complete.

The value of subsequent continence of the bowel is, however, so great to the patient as to justify the preservation of the anal canal and sphincter where such is possible, and the adoption of a more difficult proceeding to restore the integrity of the divided channel. If one wishes to do this, one may consider the advisability of adopting the plan first carried out by Trendelenburg, and practised at one period by Kraski. He freed the bowel from its abdominal aspect, and then invaginated it with its neoplasm into the ampulla of the rectum, and having dilated the sphincter, then excised the portion of bowel with the tumour from this artificially induced prolapse, and subsequently did an end to end anastomosis.

In the majority of cases treated at present by the combined method, such a proceeding is not possible, owing to the extent of the neoplasm. It may, however, be more extensively used should simpler cases be treated by the combined method. Where such is not possible, or where it is not considered desirable, the combined abdomino-sacral route so strongly recommended by Kraski may be adopted. In carrying this out, Kraski formerly laid great stress on the freeing of the tumour in the preliminary abdominal operations being carried out without opening the bowel. He, however, now finds that it is better and more expeditious to begin by dividing the bowel above the tumour. He ties two stout silk cords round its lumen, and divides it across between these ligatures by means of a thermo-cautery. The upper end of the bowel, upon which the ligatures are left long, is surrounded with gauze, and held out of the way by the assistant. The lower end is invaginated, and sewn over to prevent any possibility of escape of its contents during the subsequent manipulations. It is now drawn over towards the symphysis and the dissection of the meso-rectum proceeded with. The superior hæmorrhoid artery is now divided between two ligatures. The peritoneum where it dips over the pelvic brim and enters the posterior part of the true pelvis is then divided, which enables the rectum with the retro-peritoneal fat and lymphatics to be dissected out from the hollow of the sacrum far down into the pelvis. In front the division of the peritoneum and the separation of the bowel from the bladder is now proceeded with. This is usually easily accomplished, especially in females. The omentum is now fixed by a

temporary suture in the region of the wound to prevent it receding beyond reach into the abdomen. This point might appear to some trivial, but Kraski emphasises it as one of very great importance. It is done in order to prevent it falling back and producing torsion of the transverse colon, which with Kraski has been responsible for two fatal cases. At the same time the presence of that valuable structure at the site of repair must also be of the greatest use.

The pelvic cavity is temporarily stuffed with tampons and the abdominal wound closed.

The patient is changed to the right lateral attitude, and the operation completed from the sacral aspect according to the method known so widely as Kraski's operation with end to end anastomosis.

This abdomino-sacral method of removing rectal carcinoma has been performed by Kraski upon ten patients: six recovered, four died, a mortality of 40 per cent. This mortality, although high, is less than that usually recorded. Schloffer has recently collected the records of sixty-five cases where the combined method was adopted; of these, thirty-three proved fatal.

The importance of these statistics is apt to be over-estimated unless one bears in mind the fact that the great majority were cases of very advanced disease.

The length of the operation appears to Kraski to be greatly to blame for the high mortality. A well-devised technique combined with spinal anæsthesia he considers ought to greatly diminish the gravity of this factor.

It is a noteworthy fact, which can undoubtedly be gathered from the statistics, that the combined operation is undoubtedly much less dangerous in the case of women than men. Kraski operated on three women; all recovered. Schloffer gives the record of twenty-three cases, thirteen men, of whom eight died, and ten women, of whom one died.

The statistics of those operated on by Quénu's method are very striking: of twelve men, eleven died; of fifteen women, only one died.

A long enough period has not elapsed, and the number of cases is not yet great enough, to justify any conclusions being drawn from the statistics as to the number of permanent cures effected. From the nature of the operation, such will likely prove to be the case.

On these and other grounds, Kraski would urge that surgeons should be less reluctant to try the combined method in future, and that it should not be confined to the most serious cases only. With a perfected technique and increased experience he sees no reason why its mortality should not be reduced to that of the simpler sacral method.

Kocher of Berne would reserve this method of treatment only, to which he gives a qualified approval, for exceptional cases.

The high-seated cancer involving the peritoneum, and in which

the sphincter can be avoided, he would treat from the abdominal aspect alone, the low-lying one from below. Rehn of Frankfort considers the combined operation very dangerous. To avoid collapse and gangrene of the bowel, he has successfully performed the operation in two stages.

Kummell favours the combined operation for cancer situated high up in the rectum. Where possible he would avoid dividing the bowel above, in preference practising the invagination method of Trendelenburg and the subsequent division of the bowel outside the wound after pararectal section.

New Books and New Editions

The Hygiene of Mind. By T. S. Clouston, M.D., F.R.S.E. The New Library of Medicine. London: Methuen. 1906. Price 7s. 6d. net.

This, the second volume of Methuen's "New Library of Medicine," is described as a treatise on mental health and strength, its genesis, preservation, and risks, from the evolutionary, hereditary, physiological, psychological, and medical point of view. A work upon a subject of such importance by a writer of Dr Clouston's authority is likely to be opened with pleasurable anticipations, and we believe the author has been successful in a high degree in producing a book which may justly claim the attention, not only of medical men, but of the intelligent layman. The earlier chapters deal with the general problem of mental hygiene, with the structure and functions of the brain, and with such subjects as heredity, temperament, play, work, and fatigue. Then follows what is perhaps the most interesting section of the book, in the form of a series of chapters dealing with the various stages of life, which are distinguished as childhood, boyhood and girlhood, adolescence, manhood and womanhood, and the decadent period. These chapters are full of valuable hints as to the wise guidance of life, and the frequent illustrative references to celebrated men and to literary characters make them as interesting as they are instructive. Concluding chapters deal with special sex questions, the effects of alcohol and other stimulants, and the influence of town life.

While Dr Clouston writes out of the fulness of his own experience, it is evident that he has not neglected to make a careful study of recent literature, as is shown in his discussion of heredity, of fatigue, and of the effects of alcohol. Here and

there we note some carelessness in the wording of sentences. Thus (p. 136), "There is, in fact, for writing, a special portion of the brain convolutions, which, if injured or deficient, no writing is possible." There is another sentence equally bad on the same page. We hope such defects will be eliminated from a second edition, and that Professor Clifford Allbutt will not see them.

We can, however, cordially recommend Dr Clouston's volume, especially to parents and teachers. It will certainly aid the diffusion of sound scientific and physiological knowledge on one of the most important and interesting subjects.

Rational Organotherapy, with reference to Urosemiology. By Prof. Dr A. VON POEHL, Prof. Prince J. VON TARCHANOFF, Dr ALF. VON POEHL, Dr P. WACHS. Translated from the Russian text. Vol. I. Pp. 239. London: J. & A. Churchill. 1906. Price 7s. 6d.

THE authors of this work deal with their extremely interesting subject in an extremely able manner.

The inter-relationship of the various organs of the body, the manner in which their internal secretions supplement or act as complements to one another, their power of adapting their secretions to altered circumstances, and the capability the various secretions possess of profoundly influencing the general bodily economy, are subjects which recently have engrossed the attention of workers in all countries and not least in Russia. The rational application of the knowledge so acquired in the procedures of therapeutics is a matter largely in the future.

In the first volume of their work the authors deal, to commence with, very fully with the general subject of organotherapy, and in this part of the book special attention must be drawn to their remarks on modern urinalysis.

The value of the estimation of the "co-efficient of oxidation," in other words the proportion of the urea-nitrogen to all nitrogen, is insisted upon as a good gauge of the energy of the processes of oxidisation in the organism, and the authors believe that this method of urine examination, along with others clearly detailed, "furnishes us with the means of ascertaining in disturbances of the metabolism, not only the presence of an auto-intoxication, but also its character and stage." "As the co-efficients of urine furnish us with an insight into the condition of the metabolism, and as, at the same time, the deviation from the rule is, through the co-efficients of urine, expressed in comparable mathematical values, the co-efficients of urine offer the possibility of judging

the success or failure respectively, that is, the non-appearance of the desired therapeutic effect. As rational organotherapy can only influence the metabolism and a direct damaging effect is excluded, the practising physician has the possibility of controlling his therapeutic proceeding in chronic diseases by the urinalysis, and at the same time of judging quantitatively to what extent he has influenced the *ens morbi*."

The remainder of the volume is devoted to remarks on Spermin, and more particularly Sperminum-Poehl.

"For the wholesale manufacture of spermin, Prof. Poehl found the testicles of bulls and stallions most suitable. He subjects these to a very exact comminution, in the presence of water, making a fine emulsion, and extracts them with acidulated water. Then the albuminous bodies are separated from the fluid. Very much depends on the perfect separation of the albuminous bodies, as a remainder of albuminous bodies seriously interferes with the crystallisation of spermin as phosphate of spermin."

This part of the work might have been with advantage, we venture to think, considerably curtailed by the exclusion of many unnecessary "clinical observations." Upwards of eighty pages are devoted to "clinical observations," embracing a very large number of the ills to which flesh is heir.

A little rational discrimination would have been by no means ill-judged.

Pathology, General and Special, for Students of Medicine. By R. TANNER HEWLETT, M.D., M.R.C.P., D.P.H. Pp. 540. London: J. & A. Churchill. Price 10s. 6d. net.

TO the student of medicine there is no text-book more essential than one on Pathology, and yet in nó other branch of medical science is there so limited a choice of treatises adapted to his requirements. The more welcome, therefore, is the appearance of this excellent manual, which presents the reader with a sufficiently comprehensive study both of the general principles of pathology and of the morbid anatomy and histology of the various tissues and organs of the body.

Some may consider that hardly sufficient space has been allotted to certain sections of the work, *e.g.* the progressive and retrogressive changes and the repair of fractures, but the treatment of the subjects is in general well balanced, and the text is carefully written throughout, and takes cognisance of the most recent advances in the literature. There are no illustrations of macroscopic specimens, for the author holds that these ought to be studied in the post-mortem room and museum. But the

plates depicting the microscopic appearances of morbid specimens are numerous, beautifully reproduced, and constitute a special feature of the book.

The student's attention is constantly directed to the significance of structural changes in their relation to clinical medicine and surgery. Here and there, however, the author appears to encroach unduly on the sphere of the clinician, and some of the views which are then advanced are not always quite convincing. Numerous references are quoted in the text. They deal solely with treatises and papers in the English language, and will therefore be the more readily appreciated by students, to whom we can cordially recommend this interesting and reliable manual of pathology.

Muscles and Nerves. An Atlas of the Superficial Muscles and the principal Motor Nerves of the Human Body, for the use of Students of Anatomy and Nurses. By LOUIS B. RAWLING, F.R.C.S., Assistant Surgeon and Senior Demonstrator of Anatomy at St Bartholomew's Hospital. London: The Scientific Press, Limited, 28 and 29 Southampton Street, Strand, W.C. 1906.

THIS atlas has been published by the Scientific Press, apparently with the object of supplying an anatomically correct handbook of the superficial muscles for the use of nurses, masseurs, and all interested in the study of physical culture. The task has been undertaken by Mr Rawling. The atlas consists of four plates, photographs of an average developed male subject, with a descriptive plan annexed, showing the relation of the muscles, and large motor nerves to the surface. It is attractively got up, and its price is 3s. 6d.

A Treatise on Surgery. By GEORGE RYERSON FOWLER, M.D., Brooklyn, New York City, Examiner in Surgery, Board of Medical Examiners of the Regents of the University of the State of New York; Emeritus Professor of Surgery in the New York Polyclinic; Surgeon to the Methodist Episcopal Hospital; Surgeon-in-Chief to the Brooklyn Hospital; Surgeon to the German Hospital. Containing 888 text illustrations and four coloured plates, all original. Philadelphia and London: W. B. Saunders Company. 1906.

THIS new treatise on Surgery is a handsome work with ambitious aims. It may be said to deal with Surgery in the fullest sense of the term, a task becoming yearly more and more difficult on account of the continuous advances that are taking place. Dr Fowler, however, has shirked none of the labours incident to the production

of this work, and, in the two volumes of which it consists, we have an able, comprehensive, and attractive manual of modern surgical views and methods. The work is divided into the two headings, General and Regional Surgery, the former occupying one-half of the first volume. It takes the form of an introduction, in which the principles underlying surgical practice are discussed in a very competent manner. A good idea of the character of the work is obtained from a perusal of this section, in which considerable space is devoted to surgical bacteriology, the practical application of side-room tests, including the examination of the urine, blood, etc., and bandaging. The inclusion of such items in a book of the standard that this one reaches is open to question. The student and practitioner probably possess separate works on these subjects already, but it is only fitting with the author's desire to make it efficient and practical that he has discussed them so fully. There is no doubt they will be found of use.

The larger section on Regional Surgery runs to a thousand pages. The symptoms, diagnosis, and treatment of the surgical conditions of each region, beginning with the head and neck, are dealt with in turn. Clear and short descriptions of the most approved and recent operations are given with, as a rule, sufficient detail. But it must be confessed there are places in which the text is unaccountably insufficient and disappointing. We might quote the treatment of congenital dislocation of the hip as an example. Here Lorenz's bloodless method of reduction is little more than alluded to in a meagre seven or eight lines. Want of detail again detracts from the description of the treatment of chronic middle ear suppuration and the treatment of torticollis. As a whole, however, the text is admirably clear and terse, and the methods thoroughly up to date.

No review would be complete without a reference to the excellence of the diagrams and illustrations. They are beautifully executed and are well chosen. They are, further, all original.

Dr Fowler's treatise on Surgery will undoubtedly prove of much value in the hands of the student or practitioner.

Minor Surgery and Bandaging. By HENRY R. WHARTON, M.D., Professor of Clinical Surgery in the Women's Medical College of Pennsylvania; Surgeon to the Presbyterian Hospital and Children's Hospital, etc. Sixth edition, enlarged and thoroughly revised, with 532 illustrations. London: Rebman, Limited, 129 Shaftesbury Avenue, W.C.

THE desire to keep abreast of the advances in surgical methods and surgical teaching has altered to no small extent the char-

acter of this work now in its sixth edition. Operative surgery, unquestionably of the major type, bulks now so largely that the title Minor Surgery and Bandaging seems almost incongruous. For example, it is rather surprising in a work entitled "Minor Surgery and Bandaging" to find such operative measures as appendectomy, choledochotomy, gastrostomy, and the various forms of entero-anastomosis included, while such conditions as whitlow, ingrowing toe-nail, carbuncle, conditions met with every day in out-patient departments and undoubtedly within the term minor surgery, are sought for in vain. If one adverse remark be permitted, it is that the title hardly describes the contents of the volume. Apart from this, however, the work has much to commend it to the student and practitioner. The various forms of surgical dressings, the preparation and sterilisation of materials used in operations, amputations, fractures, and the treatment of minor surgical injuries are clearly and concisely stated. The chapter on Bandaging is considerably enhanced by the illustrations. Some of the other diagrams, however, are of an old-fashioned style for a work which claims to be up to date. Further, the use of hare-lip pins in plastic operations on the face could surely be omitted. The volume is tastefully bound.

Report on the Surgical Cases noted in the South African War, 1899-1902. Edited by Surgeon-General W. F. Stevenson, C.B., K.H.S., A.M.S., Professor of Military Surgery, R.A.M. College. London: Harrison & Sons. 1905.

In perusing this Report, the reader finds much to commend, but also a good many points on which criticism is unavoidable. In the preface and elsewhere, however, some of the latter have been anticipated and met. One is struck at the outset, for example, with the (comparatively) small number of cases cited. It appears, however, that although 23,000 wounded men were treated during the war, only the records of some 1600 patients were found of any use for the purposes of the Report.

In many instances all the information regarding a case consisted in such laconic remarks as "gun-shot wound of the leg" or even "gun-shot wound"!

It is also pointed out that the records of many of the field-hospitals were not yet available. Further, the difficulty, and at times impossibility of surgeons at the front making notes, or of doing anything more than attending to the wounded, is referred to. The latter explanation will be readily accepted by all who had any experience of the late war. It is difficult, however, to understand why

the records of the military field-hospitals should not have been at the disposal of the Committee at this late date, since the Imperial Yeomanry Field Hospital Report (largely drawn on by the editors) was available. No doubt in some instances, also, case-books were unavoidably lost. That considerable wastage of valuable material should have occurred was inevitable. It is open to question, however, whether it need have been so great. Surgeon-General Stevenson advocates as a remedy the employment in future wars of something of the nature of the " card system," special forms being supplied, so that the salient points of a case may be entered from the time the patient enters a field-hospital till his arrival at a general hospital at the base or at home. A somewhat similar suggestion by Lieut.-Colonel Simpson, R.A.M.C., is the use of admission and discharge books on the counterfoil system. We trust the matter is receiving the attention it deserves. In connection with this subject of wastage of material, we think that a printed form might have been sent to every civil surgeon who served in the war and whose address could be obtained, whether British or Colonial, inviting him to contribute any information regarding cases that he might consider of value for the purposes of the Report.

The incomplete nature of the *statistical* information in the Report is also referred to in the preface, and we are told that the complete percentages, for the reasons already given, are not yet ready, but are to be published later. We notice that with few exceptions, for example certain of the cases of nerve injuries, no after-histories of severely wounded patients appear ; such patients are " invalided home," and there the curtain falls. While admitting the difficulty of obtaining such histories, we think that more might have been achieved in this matter, at any rate in regard to the more interesting cases. It is pointed out that the material contained in the Report only concerns cases where the injury was not fatal or not immediately so, and that this must be kept in mind, and deduction made in considering the mortality of bullet-wounds of any special organ. It is probable, however, that this must always be so, since sanitary and sentimental reasons alike unfortunately prevent examinations upon those who succumb immediately to their injuries.

A feature of the Report is the number of excellent skiagrams it contains. As regards the information to be obtained, those who have read the numerous surgical papers that have appeared since the Boer War will perhaps not come across very much that is new to them. They will, however, find abundant confirmation of many of the more important facts that the earlier reports revealed. Thus the disastrous results that followed laparotomy at the front stand out very clearly, and contrast with those where expectant treatment merely was adopted. Again, the results of interference in cranial cases, so far as present statistics go, seems to warrant the per-

formance in the future of an even larger percentage of operations than the Report discloses.

Numerous examples of contusion or concussion of nerves and of pulping of the spinal cord from the simple passage of the bullet through the tissues in the neighbourhood are to be found.

It is interesting, also, to hospital surgeons to note the remarkable results that followed wounds of the stomach. Out of thirteen cases, no less than eleven of them recovered. In only one of the thirteen cases was suture of the rent resorted to, and this case died! So much for the normal and empty stomach and the small-bore bullet!

Evidence is also shown that in injuries of organs partially covered by peritoneum, such as the colon and bladder, the patient runs much greater risk when the non-peritoneal surface is wounded than he does when the bullet involves the peritoneal aspect, since septic cellulitis is more apt to occur and tends to be more severe than peritonitis in these cases.

Perhaps the best section of the Report is that which deals with head injuries, and the description of the technique in cranial operations should prove helpful to officers of the R.A.M.C. In the details given of end to end anastomosis, on the other hand, we cannot agree with the editor when he advocates the inclusion of " all the intestinal wall at the edge of the section *except the serous coat*" for the first row of sutures (the italics are ours). No real advantage is gained by this somewhat difficult procedure, and valuable time is unnecessarily expended in carrying it out.

Again, in reference to wounds of the bladder, we are told that " mechanical suction or aspiration should be employed to remove the urine as nearly as possible as it is secreted, either with a *syringe* acting on a soft catheter passed in the ordinary way, or on a tube introduced through a supra-pubic opening." Surely this must be rather an arduous business for the attendant? Is the surgical application of Sprengel's pump unknown at Netley?

The section on abdominal cases was originally under the care of Major Mallins. He was, however, " ordered to Canada, and he only had time to make the notes on the cases on which he meant to base his report." It was therefore completed by the Editor. We confess ourselves out of patience with the authorities on reading the above. This officer was entrusted with perhaps the most important section of a most important report. Why was he sent to Canada before his work was finished, or, if his presence in Canada was so essential, why was he ever given the work to do?

A Manual of Midwifery. By THOMAS WATTS EDEN, M.D., C.M. Edin., F.R.C.P. Lond., Assistant Obstetric Physician and Lecturer on Practical Midwifery, Charing Cross Hospital, etc. Pp. viii. + 518, with 26 plates and 233 illustrations in the text. London: J. & A. Churchill. 1906. Price 10s. 6d. net.

DR EDEN has written a very serviceable book on Midwifery. It is not one of the ponderous tomes which we have of late come to look for from across the Atlantic Ocean or the North Sea; it is not an exhaustive treatise, but a convenient manual on the subject of Obstetrics. To use the author's own words, his aim has been, "while omitting nothing which is essential either in theory or practice, to eliminate non-essential or collateral subjects, and to deal with every question briefly, and as far as possible from a practical standpoint." This aim has been attained, and within these self-imposed limits the work well fulfils its purpose. So well does it deal with the subject of Practical Midwifery, that we will not cavil at the inclusion of some such matters as the minute anatomy of the placenta, the structure of Peters's early ovum, the appearance of the epithelium covering the umbilical cord, and the microscopic characters of tubal moles.

The reviewer naturally turns to such a debated subject as eclampsia in order to learn what his author thinks upon such a matter. Dr Eden takes a middle and (we think) a safe course between the two extremes of operative and non-operative treatment of this greatly feared malady. He controls the convulsions by chloroform, chloral hydrate, bromide of potash, and morphia, naming the drugs in this order of preference. For the elimination of the poison he does not highly recommend venesection, but adopts the subcutaneous injection of saline solution as a routine treatment; the use of pilocarpine he condemns, and we think he is right; and he mentions thyroid extract as a drug which may turn out to be useful. With regard to operative interference, he emphasises a fact which is often overlooked, that emptying the uterus does not always immediately stop the convulsions, for the reason that toxines remain in the system for some time and continue to exercise a prejudicial effect. Dr Eden, however, does not hold his hand in cases where he regards the rapid conclusion of labour desirable, and he employs dilatation of the cervix with hydrostatic bags and the use of forceps or version. Renal decapsulation and spinal puncture are not referred to.

The illustrations, with the exception of some which exhibit the minute anatomy of the healthy and diseased placenta and various abnormal productions of pregnancy and a few others,

have been selected with considerable judgment from the standard works of Bumm, Edgar, Whitridge Williams, Ribemont-Dessaignes, Galabin, Farabœuf and Varnier, Nagel, Budin, Webster, Dakin, Barbour, and of others.

A System of Gynæcology by many Writers. Edited by THOMAS CLIFFORD ALLBUTT, M.A., M.D., LL.D., F.R.S., etc., W. S. PLAYFAIR, M.D., LL.D., F.R.C.P., and THOMAS WATTS EDEN, M.D. (Edin.), F.R.C.P. (Lond.). Second Edition. Pp. xx. + 950, 281 illustrations. London: Macmillan & Co., Ltd.; New York: The Macmillan Company. 1906. Price 25s. net.

SINCE the first edition of this standard work on Gynæcology appeared (in 1896), one of the editors, Dr W. S. Playfair, and three of the best known contributors (Dr Greig Smith, Dr Milne Murray, and Mr Knowsley Thornton) have been removed by death. Their places have been taken by Dr Eden, Prof. J. W. Taylor, and Prof. H. R. Spencer. Instead of twenty-six there are now thirty articles, and the latter number does not include all the former articles, for that on the Electrical Treatment of the Diseases of Women (by the late Dr Milne Murray) has dropped out; the new articles are those on Methods of Pelvic Examination in Women (by Dr Berry Hart), on Chorion-epithelioma (by Drs Eden and Teacher), on Antisepsis and Asepsis in Relation to Gynæcological Surgery (by Dr T. W. Eden), on Gonorrhœal Infection of the Female Pelvic Organs (by Dr J. B. Hellier), on the After-Treatment of Gynæcological Operations (by Dr G. E. Herman), and on Vaginal Hysterectomy and Colpotomy (by Prof. H. R. Spencer). There have been other changes; Dr Champneys now writes on Sterility, Dr Blacker on Pelvic Hæmatocele, and Dr Eden has revised the late Dr Playfair's article on the Nervous System in relation to Gynæcology. It will thus be seen that the book has been so considerably altered as to be almost a new book. While still retaining its character of British conservatism in matters gynæcological, the System has not by any means closed its pages to new and valuable methods of diagnosis and treatment. Atmocausis is described but not strongly recommended; the Röntgen and Radium Rays, and Electric Heat and Light Baths are referred to, the various forms of abdominal hysterectomy are treated at considerable length, and colpotomy is fully explained. Many new illustrations have been added, and there is a good index. The work is sure to retain the place of honour it has already gained among British text-books of Gynæcology.

Uterine Fibroids and Other Pelvic Tumours. By BEDFORD FENWICK, M.D., Gynæcologist to the Hospital for Women, Soho Square, etc. Pp. 96. London: E. H. Blakeley. 1906. Price 3s. 6d.

THIS little book contains a series of articles published by the author during the last twenty years. They deal with the subjects of uterine fibroids (their pathology, symptoms, and treatment, and their effect as complications of pregnancy), with the connection between pulmonary phthisis and ovarian disease (Dr Fenwick thinks that the great predisposing cause of ovarian disease is a family tendency to phthisis), intra-abdominal tumours as a cause of cardiac degeneration, and the statistics of four years' hospital surgery. The author is to be congratulated on the success of his operative work: six deaths in 181 patients, and only one of these from septic peritonitis, is not a record of which he need feel ashamed. All the articles are interesting, and many gynæcologists will be glad to have them reprinted in this convenient form.

The Plague in India, its Causes, Prevention, and Cure. Compiled by RAI BAHADUR LALA BAIJNATH, B.A., F.A.U., Judge, Allahabad. Second edition. Pp. 64. Meerut: The Vaishya Hitkari Office. 1906. Price 4 annas.

THIS is a pamphlet dealing with the occurrence of plague in India, compiled by Mr Baijnath from various sources and with the assistance of Surgeon-Major Vasu, I.M.S. It deals with the ravages, varieties, methods of spread, mode of prevention and treatment of plague, and concludes with a series of general directions to those exposed to the disease. It is not often that a layman succeeds in writing on a medical subject an essay which is distinctly destined to be useful. While it is not possible to homologate all the statements set forth by the author of this pamphlet, much sound advice and information are contained in its various sections. Its insistence upon the potent influence of filth and insanitary conditions of life in favouring the spread of plague renders it a valuable and instructive essay for distribution amongst the native population. If it succeed in convincing the people of this influence and in reconciling them to the necessary modification of their customs of living, the author will have fulfilled one of his chief objects in its production.

Public Health Legislation and Model Bye-Laws. By MARTIN ELLIOTT, of the Middle Temple and Western Circuit, Barrister-at-Law, and GILBERT ELLIOTT, M.R.C.S. (Eng.), L.R.C.P., D.P.H. Pp. xii. and 168. London: H. K. Lewis. 1906. Price 5s. net.

THIS handy volume contains a summary of the Public Health Act (1875), and of other Acts dealing with sanitation and applicable to England. It also includes various Orders and Regulations of the Local Government Board, and the Model Bye-Laws recommended by the Board to sanitary authorities. The Acts are not given in full, but their provisions are condensed, so that the student may more easily master the purport of the various clauses. The main object of the book is to present in assimilable form the knowledge of sanitary law required from candidates for the Diploma in Public Health. This object has been well attained, and the book deserves the success it will no doubt achieve. There are few notable admissions, but we think the authors should not have neglected to inform the student that sanitary authorities have power to make permanent or temporary additions to the list of notifiable infectious diseases. The explanation of the method of controlling the height of houses in London might be more clearly expressed for the benefit of the student not already acquainted with the subject. Frequent cross-references and the quotation of cases decided in the Law Courts add to the value of a useful manual for students of public health.

Supplementary Essays on the Cause and Prevention of Dental Caries. By J. SIM WALLACE, M.D., D.Sc., L.D.S., Honorary Dental Surgeon, West End Hospital for Nervous Diseases; Assistant Dental Surgeon, National Dental Hospital. Pp. 81. London: Baillière, Tindall & Cox, 8 Henrietta Street, Covent Garden. 1906. Price 2s. 6d. net.

AS indicated by the title this work is intended to supplement and expand some of the problems dealt with in a previous book by the same author on the cause and prevention of decay in teeth. We believe that, in the main, Dr Sim Wallace's propositions are true, and the evidence that is accumulating is convincing a larger and larger circle that the commonest, and, in its results, one of the most serious diseases to which modern communities is liable, is preventable and should not exist. The seeds of dental caries are sown in infancy and childhood, and prevention therefore lies largely with the family doctor and the parents, and we hope that as a result of the present widespread interest

of the medical profession in the subject of dietetics, coming generations will be spared this scourge.

There is no need for an extended review of these suggestive essays. They require no recommendation to those who have read the original work, and we can assure those who have not done so that, whether they agree or disagree with the author's conclusions, the essays are well worth the reading.

An Atlas of Illustrations of Clinical Medicine, Surgery, and Pathology. Fasciculus XXV.—Smallpox. London: The New Sydenham Society. 1906. Price 21s.

SMALLPOX of all the eruptive fevers best lends itself to illustration by photography, and the photographs in this fasciculus of the Sydenham Society's Atlas are as good as any illustrations of the eruption of smallpox which it has been our good fortune to see. They are the work of Dr Allan Warner of the Isolation Hospital at Leicester, and they show very distinctly the different stages and varieties of the smallpox eruption. Their value is enhanced by the fact that the progress of the eruption is illustrated by a series of plates of one and the same patient, both in the discrete and in the confluent variety of the fever. Other plates are given showing cases of mild smallpox as it occurs in the vaccinated, and we are particularly impressed by the concluding series of photographs in which the advantages of vaccination are well brought out by the method of showing side by side individuals infected from the same source, of whom one has been vaccinated and the other not. These pictures would be of the greatest use to those who give popular lectures on vaccination, and are also very useful as illustrations of modified smallpox. A brief description is appended to each photograph, and we may conclude by saying that this fasciculus should be in the hands of all lecturers on medicine.

List of Books Received

From Adam & Charles Black.

Tuberculosis: Its Origin and Extinction. W. Pickett Turner.

From Adlard & Son.

The Puerperium. C. N. Longridge. Price 5s.

From Ed. Arnold.

The Diagnosis of Nervous Diseases. Purves Stewart. 15s.

From Baillière, Tindall & Cox.

Manual of Anatomy. A. M. Buchanan. Vol. i. Price 12s. 6d. net.

Aneurysm of the Abdominal Aorta. Fred. P. Nunneley.

Clinical Studies in Treatment of the Nutritional Disorders of Infancy. Ralph Vincent. Price 3s. 6d. net.

Lectures on Diseases of the Lungs. James A. Lindsay. Price 10s. 6d.

Clinical Lectures on Enlargement of the Prostate. P. J. Freyer. Price 6s. net.

On Retro-peritoneal Hernia. Second edition. B. G. A. Moynihan. Price 7s. 6d. net.

The Sigmoidoscope. P. L. Mummery. Price 5s. net.

Syphilogy and Venereal Disease. C. D. Marshall. Price 10s. 6d.

From E. N. Blakeley.

Uterine Fibroids. Bedford Fenwick. Price 3s. 6d.

From Blackwood & Sons.

The Chici-Problem. Rich. Gill. Vol. i., price 10s. net. Vol. ii., price 10s. net.

From Messrs Churchill.

Medical and Pharmaceutical Latin. Reg. E. Bennet. Price 6s.

Theory and Practice of Surgery. Will. J. Watsham and Walter G. Spencer. Price 18s. net.

Manual of Midwifery. T. Watts Eden. Price 11s. 6d. net.

The Schott Methods of the Treatment of Chronic Diseases of the Heart. W. Bezley Thorne. Price 5s. net.

The Use of Shower Baths in Schools in England and on the Continent. Fred. Rose. Price 1s.

A Short Practice of Medicine. Robt. A. Fleming. Price 10s. 6d. net.

From Gill & Sons.

Nursing at Home. J. D. E. Mortimer and R. Y. Collie. Price 8d.

From Henry Glaisher.

Clinical Lectures on Neurasthenia. Thomas D. Savill. Price 7s. 8d. net.

From Longmans, Green & Co.

Helouan. Egyptian Health Resort. H. O. Hobson. Price 2s. 6d.

From Wm. Green & Sons.

Guide to Anæsthetics, for Students and Practitioners. Thomas D. Luke. Price 5s.

Medical Diagnosis. J. J. Graham Brown. Price 8s. net.
Encyclopædia and Dictionary of Medicine. Vol. 2. Bre-Ear.

From Griffin & Co., Limited.

The Treatment of Diseases of the Digestive System. Robert Saundby. Price 3s.
Outline of the Diseases of Women. John Philips. Price 7s. 6d.

From Paul B. Hoeber.

Uric Acid. Francis H. M'Crudden. Price $2.50 net.

From William Heinemann.

Hints on the Management of the Common Infections. R. W. Marsden. Price 3s. 6d.

From H. K. Lewis.

Catalogue of Lewis's Medical and Scientific Circulating Library. Price 6d. net.
Studies in Blood-Pressure. Geo. Oliver. Price 2s. 6d. net.
The Climate of Lisbon. Dr D. G. Dadjado. Price 2s. 6d.
The Extra Pharmacopœia. Martindale and Wescott. Price 10s. net.
Medical Electricity. H. Lewis Jones. Fifth edition. Price 12s. 6d.
The Röntgen Rays in the Diagnosis of Diseases of the Chest. Hugh Walsham and T. H. Orton. Price 6s. net.
Refraction of the Eye. Stanford Morton. Price 3s. 6d.
Aequanimitas and other Essays. W. Osler. Price 8s.

From The New Sydenham Society.

Illustration of Syphilis and Smallpox. Alfred E. Russell.

From Libraire Paris Universelle.

Le Malade et Le Médecin. Dr Doyen.

From Macmillan & Co.

Studies in Clinical Psychiatry. Lewis Bruce. Price 10s 6d.
Circulation and Respiration. Sir Lauder Brunton. Price 7s. 6d.

From Rebman & Co.

Causes and Treatment of some Forms of Vertigo. A. C. Dutt.
Minor Surgery and Bandaging. W. R. Wharton. Price 14s. net.
Diseases of Women. J. Bland-Sutton and A. Giles. Price 11s. net.
The Treatment and Prophylaxis of Syphilis. Alfred Fournier. Price 21s. net.
Menstruation and Skin Diseases. L. Duncan Bulkley. Price 5s. net.

Genito-Urinary Diseases. Casper. Price 26s.

Hypnotism. Force. Price 7s 6d.

Atlas of Topographical Anatomy. Bardeleben and Haeckel. Price 32s.

From Saunders & Co.

Treatise on Surgery. Geo. R. Fowler. Vol. ii. Price £1, 11s. 6d.

Atlas and Text-Book of Human Anatomy. Dr Johannes Sobotha. Vol. i. Price 25s

Illustrated Medical Dictionary. W. A. Dorland. Fourth edition.

From Scientific Press, Ltd.

Muscles and Nerves. Louis B. Rawling. Price 3s. 6d. net.

The Care of Children. Robt. J. Blackham. Price 1s. 6d.

From Smith, Elder & Co.

Auscultation and Percussion. S. Gee. Price 6s.

From G. Steinheil.

L'ame et le Système nerveux. Auguste Ford. Price 5 frs.

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